



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

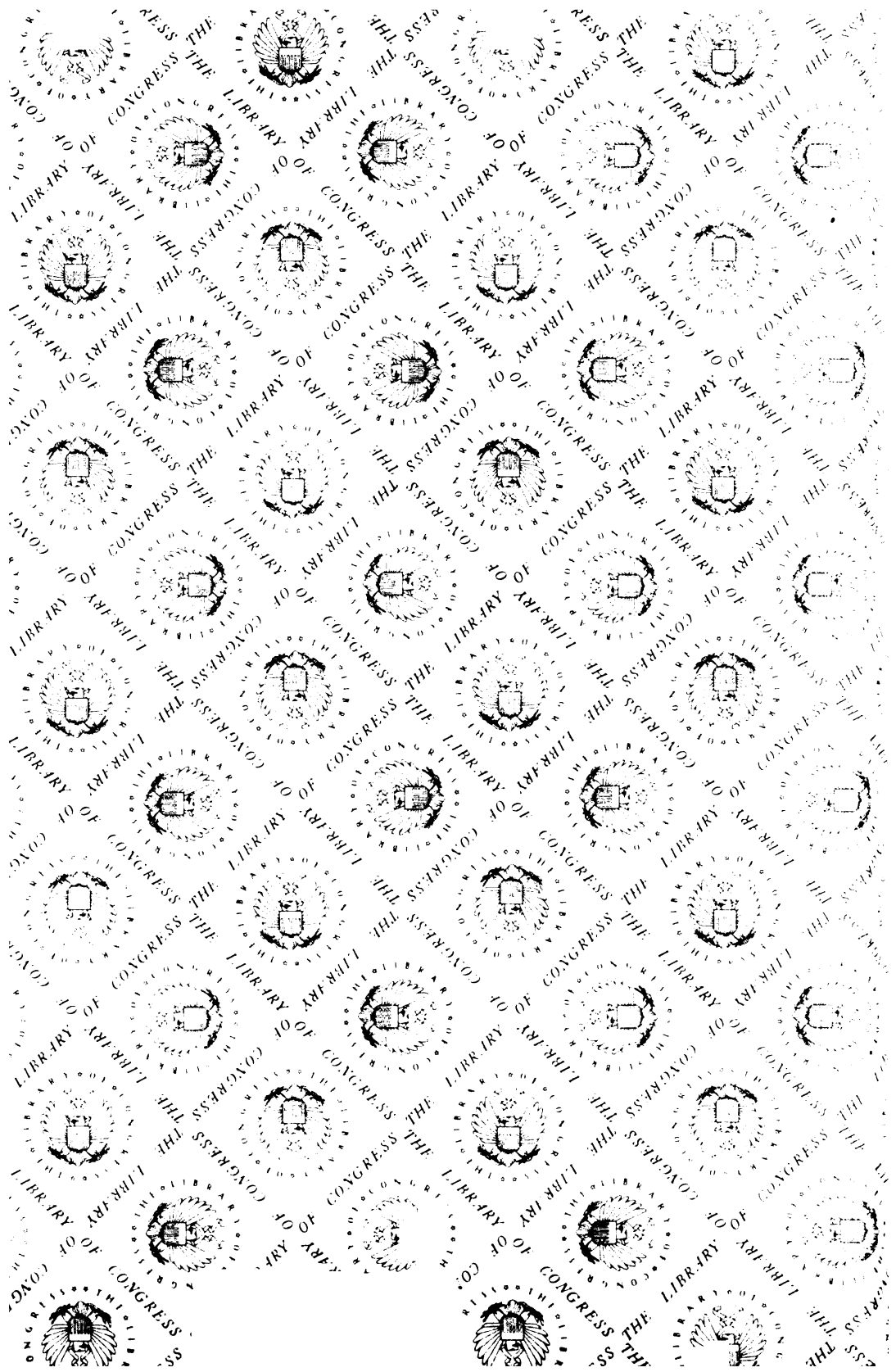
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

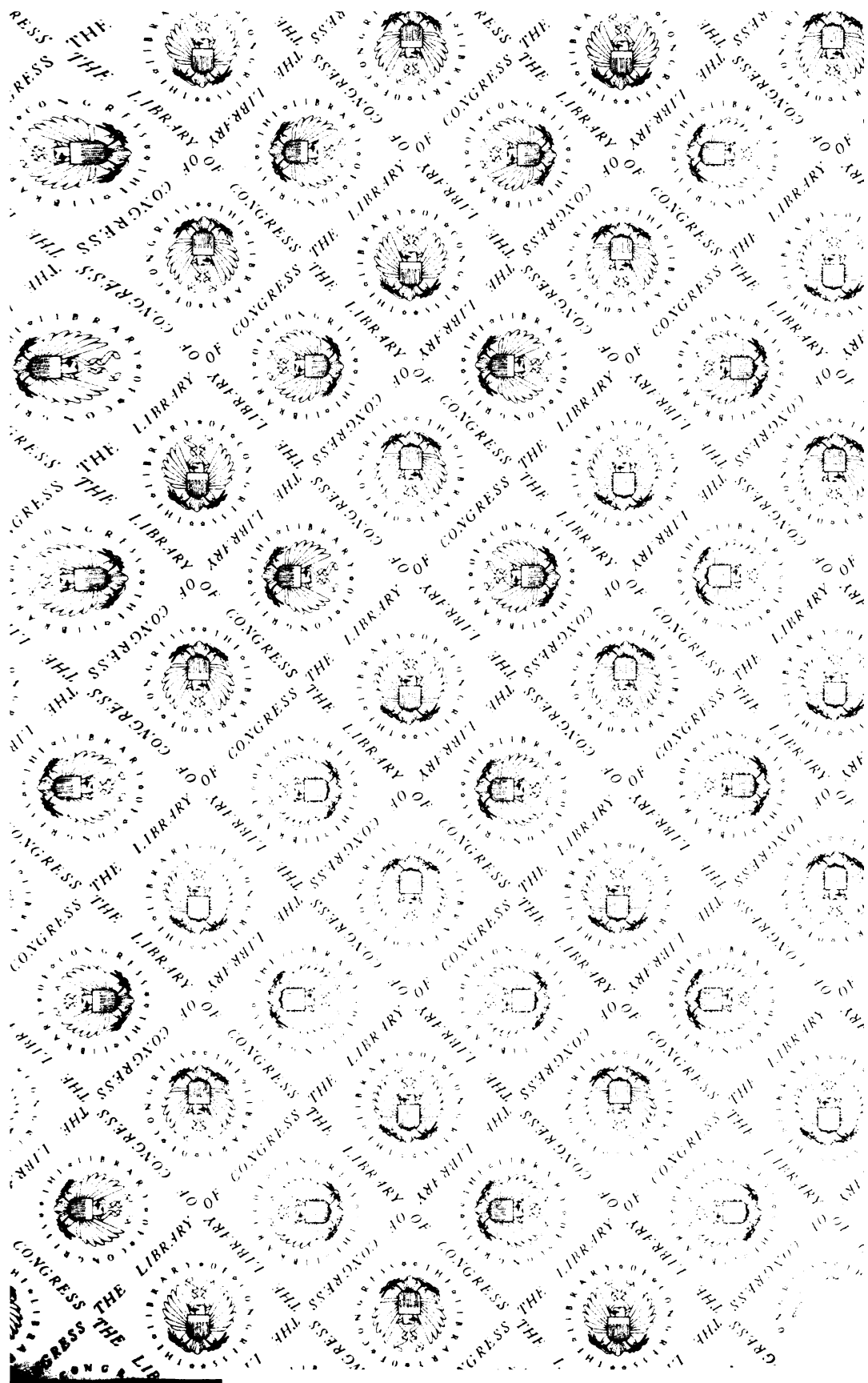
We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

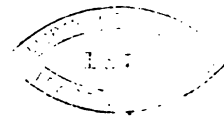




THE
COUNTRY GENTLEMAN'S
MAGAZINE

WITH NINETY-FIVE ENGRAVINGS

14



VOL IX

LONDON
SIMPKIN, MARSHALL & CO
EDINBURGH: JOHN MENZIES & CO. DUBLIN: M'GLASHAN & GILL
MDCCCLXXII

\$3
C8

CONTENTS.

GENERAL ARTICLES.

| | | | |
|--|-----|--|-----|
| Long Leases and Tenant-right | 1 | Co-Operative Farming | 247 |
| The Duke of St Albans on the Agricultural Labourer | 3 | The Great Meat Question | 250 |
| Professor Fawcett on Agricultural Labour | 5 | How to Increase our Food Supplies | 252 |
| Boards of Agriculture | 9 | Dr Smith on Condensed Milk and Preserved Meat | 255 |
| The Royal Agricultural Benevolent Institution | 11 | Agricultural Strikes | 257 |
| An American View of English Farming | 12 | Rural Cottages | 262 |
| Statute Hiring, or Hiring Fairs | 13 | Horses and Horsemen | 263 |
| How to Increase our Meat Supplies | 15 | Stray Notes from the South of Ireland | 265 |
| Irish Absenteeism—Past and Present | 81 | Earl Derby on Labour and Wages | 266 |
| The Irish Land Act and the Lords Committee | 83 | Vienna Universal Exhibition, 1873 | 268 |
| Professor Rogers and the Land Laws | 84 | Irish Tenant-Farmers and their Labourers | 321 |
| The Cost and Evils of Ground Game | 86 | The Irish Land Act | 324 |
| Local Taxation | 89 | Irish Agricultural Statistics | 325 |
| Housing and Education of Agricultural Labourers | 91 | The Agricultural Labourer and his Friends | 327 |
| The Farm Servants in the North of Scotland | 93 | Lord Carnarvon on the Agricultural Labourer | 329 |
| Texas as a Field for Emigration | 97 | Lord Napier on the Land Laws | 332 |
| Jonathan and Simpson: or Meal and Milk | 99 | Sir John Bowring on the Agricultural Labourer | 335 |
| The Royal Agricultural Society and Libel | 101 | Agriculture and Agriculturists | 336 |
| A Peep at Scotland | 103 | Disastrous Harvests | 339 |
| Veterinary Department & Foot-and-Mouth Disease | 105 | The Proper Way to do it | 340 |
| The Accommodation of Agricultural Labourers in the North | 167 | Sanitary Improvements in the Rural Districts | 342 |
| Agriculture in Australia | 168 | The Transfer of Land | 343 |
| Agricultural Leases and Land-Tenure | 169 | Lord Derby on Land, Labour, and Game | 401 |
| Another Successful Sewage Farm | 174 | Lord Portman on Wages and Unions | 406 |
| Legislation and the High Price of Meat | 175 | Impediments to Veterinary Science in Great Britain | 408 |
| The Price of Meat and Restrictions on the Cattle Trade | 176 | Landlord, Tenant, and Labourer | 413 |
| Warriors in the Harvest Field | 179 | Damage by Game and Rabbits | 415 |
| The Agricultural Labourer in the Seventeenth Century | 241 | Agricultural Piece-Work and Cattle Disease Legislation | 417 |
| A Whig Speaker on Farming | 243 | German Agricultural Labourers | 419 |
| The Work of the French Peasant Farmers' Seed Fund | 245 | Compensation for Unexhausted Improvements | 420 |
| | | Fashionable Animals and Fancy Prices | 421 |
| | | Minnesota as a Field for Farmers | 424 |
| | | Ransome's Artificial Stone | 425 |

OUR PASTURE GRASSES.

| | |
|-----------------------------|-----|
| <i>Festuca Heterophylla</i> | 433 |
|-----------------------------|-----|

THE FARM.

| | | | |
|---|------------------------|---|-----|
| Import and Export of Agricultural Commodities | 22, 118, 182, 274, 436 | Bishop Ellicott and the Agricultural Labourer | 203 |
| Tiptree Hall Farm | 25 | Wheat Culture | 277 |
| Finger-and-Toe in Turnips | 27 | Wild Oats | 279 |
| Sugar-Beet Cultivation in England | 30 | An Estimate of the Crops | 281 |
| Beet-Sugar Cultivation in the United States | 31 | The Potato Blight | 282 |
| The Improvement of Pasture Land in Wales | 32 | Irrigating Pasture Land | 284 |
| Diseases in Turnips | 36 | The Waresley Stud Farm | 287 |
| Breeding of Agricultural Horses | 37 | The Dunmore Shorthorns | 288 |
| The Best Manures for Potatoes | 40 | Cattle in the United States | 289 |
| The Hedgerowism of the United Kingdom | 44 | The Cost of Producing Live Stock | 290 |
| The Turnip Beetle and Crops | 109 | Agricultural Matters in Italy | 292 |
| Pasturing v. Soiling | 110 | Compensating a Retiring Tenant | 294 |
| Farming in Suffolk | 112 | The Purification and Utilization of Sewage | 296 |
| Steam Culture and Clay Soils | 116 | Prickly Comfrey as a Fodder Plant | 350 |
| The Chili Saltpetre Deposits of Peru | 117 | Horn and Corn | 351 |
| Agricultural Notes | 121 | Breed of Horses in Ireland | 353 |
| Impediments to Agricultural Progress | 122 | West Highland Cattle | 354 |
| Concrete Buildings on the Farm | 124 | Farms and Cottages in Cheshire | 358 |
| Farm Competition in England | 126 | Improvement of Waste Land in Sutherlandshire | 360 |
| The Allotment System | 127 | Capital applied to Agriculture | 366 |
| Price of Lamb | 131 | Something about Deer Forests | 369 |
| Modern Farming and the Breeding of Stock | 185 | Sewage Irrigation at Bishop's Stortford | 372 |
| Breeding and Rearing Sussex Stock | 186 | The Potato Disease | 375 |
| Oil-Cake Manufacture | 188 | The Subsoil as Manure | 438 |
| The Supply of Chemical Fertilizers | 190 | Flax Culture in Ireland and its Lessons | 440 |
| Steam Cultivation on Fiskens System | 191 | Harvesting and Cleaning Seed | 441 |
| Our Common Lands | 192 | The Ashford Herd of Shorthorns | 444 |
| Carrots | 194 | Lord Saltoun on Steam Cultivation | 446 |
| The Potato Disease and its Cause | 196 | Reclaiming Mountain Land | 448 |
| Transit of Cattle by Rail | 198 | A new Sewage Experiment | 449 |
| Agricultural Progress in Ireland | 199 | Sewage—Filtration and Irrigation | 450 |
| Earl Spencer on Irish Agriculture | 201 | Italian Agriculture | 452 |

AGRICULTURAL ENGINEERING.

| | | | |
|---|-----|--|---|
| Anti-Mildew Grain Protector | 17 | The Prize Engine at Cardiff | 2 |
| New Method of Fastening Cattle | 20 | Improvements in Breast-Strap for Horses | 2 |
| Murray's Brick-making Machine | 101 | The Prevention of Formation of Scale in Boilers | 2 |
| An Improvement in Cattle-Tying | 106 | Haltering Wild and Checking Vicious Horses | 2 |
| Trial of Green's Mowing Machines | 107 | Bread and Sugar Grinder, &c. | 2 |
| An Improved Bag-Holder | 181 | | |

THE GARDEN.

| | | | |
|---|-------------------|--|-----|
| Suggestions for the Improvement of the Verbena | 45 | Sweet Smelling Flowers | ... |
| Herbaceous and Alpine Plants | 47, 205, 306 | A Ground Vinery and its Management | ... |
| Rotation of Crops in the Kitchen Garden | 49 | A Few Beautiful Shrubs for the Spring | ... |
| Glass Houses—Construction and Ventilation | 51 | Bud-Pruner and Fruit-Gatherer | ... |
| New and Rare Plants | 55, 136, 212, 458 | Some Flowering Begonias | ... |
| Pruning Shears | 59 | How they Grow Bulbs in Holland | ... |
| M'Intosh's Turf Verge Cutter | 60 | A Cheap Fumigator | ... |
| The Pansy | 133 | A Gardener's Stool | ... |
| Wallflower | 135 | Improved Grafting Tool | ... |
| Mountable Flower Pots | 140 | Campanula Media Calycanthema | ... |
| The "Syrileon" | 141 | A California Lawn Sprinkler | ... |
| Table and Stand for Flowers | 141 | The Construction of Fountains | ... |
| Drescheler's Fumigator | 142 | | |

ARBORICULTURE.

| | | | |
|--|----|--|----|
| Evergreens for Small Pleasure Gardens | 61 | Ornamental Trees for City and Suburban Planting | 62 |
| Peach Trees Attacked with Mildew | 62 | | |

THE VETERINARIAN.

| | | | |
|--|-----|---|-----|
| Garget in Cows | 63 | Rabies and Hydrophobia | ... |
| Red Water in Cattle and Sheep | 64 | Treatment of Foot-and-Mouth Disease | ... |
| Some of the Causes of Disease in Stock | 66 | Prevention of Abortion, &c., in Mares, Cows, and | ... |
| Scour in Sheep | 146 | Ewes | ... |
| Diagnosis—Discrimination of Disease | 148 | Horses' Feet | ... |
| Supposed Case of Poisoning a Cow by Populus | 150 | Horse-Shoeing | ... |
| Balsamii | 150 | Inclination, or Obliquity of the Horse's Foot | ... |
| The Prevention of the Cattle Plague | 219 | Horses' Shoes | ... |
| Disease of the Intestines | 220 | The Sulphur Treatment for the Lung Disease in | ... |
| Foot-and-Mouth Disease in Australia | 223 | Cattle | ... |

DAIRY AND POULTRY-YARD.

| | | | |
|--|-----|--|-----|
| The Curing of Cheese | 68 | The Adulteration of Milk | ... |
| Facts and Hints about Poultry | 69 | The Condensation of Milk | ... |
| Rearing Turkeys | 71 | Improvement in Cheese-making | ... |
| Three Years of Poultry Keeping | 151 | Poultry and Profit | ... |
| Poultry from a Commercial Point of View | 226 | Butter Factories | ... |
| Impure Milk; How Caused and its Injurious Effects | 315 | Butter Making in Cheese Factories | ... |
| The Comparative Profits of Butter and Cheese | 317 | Feeding for Eggs, &c. | ... |

THE APIARIAN.

| | | | |
|-----------------------------|----|--------------------------|-----|
| Uniting Hives | 72 | Pasturage of Bees | ... |
| Experience with Bees | 73 | Transporting Bees | ... |

THE NATURALIST.

| | | | |
|--|-----|---|-----|
| Salmon and Trout Breeding | 74 | American Black Bass | ... |
| A Monster Sturgeon | 156 | Salmon Breeding at Inverrossachs | ... |
| Grouse Shooting and Pigeon Shooting | 229 | The Parasitical Foes of the Farmer | ... |
| The Friends and Foes of the Farmer | 231 | Pond Fish | ... |

THE COUNTRY GENTLEWOMAN.

| | | | |
|--|-----|---|-----|
| Plans for Drawing-room Decoration | 76 | Window Gardening | ... |
| Liquid Manure for House Plants | 80 | Something about Pickles | ... |
| 49 In-door British Fernery | 158 | Conservatory, Fernery, Staircase, and Drawing- | ... |
| How Wax Flowers should be Grouped | 159 | room Decorations | ... |
| The Decoration of Windows in Summer | 234 | Recipes for Cooking Spinach | ... |
| Plans for Ferns | 237 | | |

THE ENTRITY GENTLEMAN'S MAGAZINE

JULY 1872

LONG LEASES AND TENANT-RIGHT.

At the last meeting of the Hungerford Chamber of Agriculture, Mr H. commenting upon the advantages of leases, said:—In farming, as in other many changes have occurred of late which very materially affect the cultivation and arrangements. We have now a greatly improved implements, artificers, steam ploughs, &c., to provide assist the capability and progress of the soil, but these new lights may be allowed to use the term) necessarily require a considerable increase of capital to carry on a farm of magnitude; therefore yearly tenants are most disadvantageously situated as to these appliances, as it is but reasonable that a tenant-farmer should have a substantial security to reap such advantages as might be calculated on. This cannot be done in one year's occupation, and shews the necessity of leases or written agreements securing the interests of the tenant for expenses incurred by permanent improvements and exhausted artificial manures. Without a substantial guarantee for protection to the productive capabilities of the soil, it cannot be expected to be fully developed. A practical man knows the benefit of long farming is not, in many particulars, felt at the end of the year, and therefore, there is no inducement to a yearly tenant that he will retain the occupation long enough to derive its full benefit.

Whether from manures, steam power, corn or linseed cake feeding, &c.

chalking, road-making, &c., a great disadvantage, as well as loss is experienced by the occupier, and, indirectly, the public are adversely affected by the capabilities of the soil not being fully developed, and the larger produce brought to market. With regard to implements, which are now so necessary, but very costly, it is a well known fact that a second-hand article, if ever so good, seldom realizes anything like its value, so that a tenant (who has provided those appliances at his own cost) is liable to a serious loss if obliged to relinquish the occupation of a farm after a short term. I do not mean to imply that an outgoing tenant should be compensated for such by the landlord, but I do think that many misunderstandings which occasion change of tenants would be prevented if written agreements were more generally in existence. And I am of opinion that such agreements should contain clauses to recoup an outgoing tenant for outlay such as unexhausted manures, corn and cake feeding, carriage of materials for erecting new buildings, chalking, draining, road making, &c. I doubt not some will think it unnecessary to enter into these particulars, but a careful observer cannot fail to see, and frequently hear of great injustice occasioned by mistaken confidence. Where so much capital is invested, a simple verbal agreement, even for a yearly tenant, is not a satisfactory holding, or calculated to encourage good farming, however high in reputation the proprietor or his agent might be.

Caution will, however, at present, I fear, be little attended to, so numerous are applicants for farms almost any terms are acceded to, regardless of future consequences; nevertheless, sooner or later, overwhelming difficulties are sure to be the result in very many cases of this reckless competition. It cannot be that farming is such a profitable occupation to induce these injudicious bargains. All tenant-farmers, unless especially favoured, know that arable land farming, the past few years, has been anything but remunerative. I believe, taking the three adjoining counties of Wilts, Hants, and Berks, a profit of 5 per cent. on the capital employed has not been realized. I do not wish to dishearten young tenant-farmers, but I must say the future prospects, considering the high rent (no doubt promoted by unwise competition), increased and ever increasing taxes, and parochial rates, increase of outlay for labour, and mechanics' charges: I repeat that the future prospects of farming are anything but promising. We frequently hear it stated the landlord is really the ratepayer; how this statement is in accordance with facts I have yet to learn, for instead of abatements being made for increasing rates, whenever a change in proprietorship or tenantry occurs, it is a common practice to have a new survey, ostensibly to adjust the rent equitably with regard to changed circumstances. But whoever heard of a surveyor valuing a farm without setting the rent up? It is a generally understood thing a valuation is intended to increase the rent, which the extraordinary and unaccountable competition for farms encourages. A reaction with regard to such competition might be deferred for a period, but I feel assured that at no distant time such a result will be a fact. No class of men, not even tenant-farmers, will foolishly long continue a profitless occupation, and too many will from necessity relinquish their farms. I believe a great number of tenant-farmers are in a hopeless state of difficulties. It possibly might be inexplicable to many how it is tenants do

not at once relinquish unprofitable occupations. A little reflexion and would, I think, demonstrate the fact many are similar to a dilapidated building where they are, but a removal would be a "concluding catastrophe." With releases I think a long one indispensable term of eight or ten years is not sufficient, and does not give a tenant for his skill and outlay to be remunerated, for the following reasons, namely: A farm taken when out of proper working order would take at least four years to get into proper working order, and to induce tenant improvements a legal guarantee for a considerable period is undoubtedly necessary. Life with all is uncertain, even young or middle aged, not unfrequently die before an opportunity to reap the advantages of improvements has occurred. Under such circumstances a change of tenantry frequently follows, and unless a tenant is existing, either the landlord or successor tenant reaps the advantages of previous improvements, to the exclusion of the family and rounding relatives of the departed tenant. When a new survey is made—either on the death of a proprietor or on the death of a tenant—the surveyor, as a matter of course, looks to the present condition of the farm, and assesses the rent without reference to the improvements made, and thus the skilful improver and his heirs are unjustly treated, and deprived of recompense for expended capital. I cannot help thinking the general interest in agriculture would be much assisted if bounties on the produce of Agriculture were increased in such a manner as to give more convenient opportunities to many remote localities for personal attendance.

A resolution to the effect that long leases were most advantageous to both landlords and tenants was, after some discussion, adopted.

*THE DUKE OF ST ALBANS ON THE AGRICULTURAL
LABOURER.*

AT a meeting of the Nottingham Chamber of Agriculture lately, the Duke of St Albans, who occupied the chair, made the following excellent remarks in introducing the subject of the Agricultural Labourer. His Grace said :—I approach this subject with the very greatest difficulty. I have no practical experience of the subject, and I know many whose experience I value disapprove of its discussion. I can assure you my mind has oscillated since my name has been on your paper between two endeavours—first, to back out of a task, for which I feel myself so unfit, without discourtesy to you ; and, secondly, to ascertain the opinion of those of my friends who could possibly give me any light on the subject. For my part, I see no harm in the Chamber looking this question boldly in the face, for I believe it forms matter of conversation in every farmer's house and labourer's cottage in the country—at a time, too, when we can discuss it as a possible difficulty, not, most happily, in the heat of discord and strife. It was difficult to suppose that when the other trades had adopted the principles of combination in their manual branches, that that very large class engaged in the cultivation of the soil would fail for any length of time from forming unions by which they believed the working-classes generally had benefited their position. Yet the agricultural world seem to me, from the accounts I read in the papers, to consider itself, when the Warwickshire strike took place, launched into an unexpected crisis. I would not seem to undervalue the present agitation on the question of farm labour. It is certainly the most important one for every one in this room which has arisen in our time. For the future agricultural unions and possible strikes for an increase of wages must form part of a farmer's calculations. The Central Chamber of Agriculture, on the motion of Mr

Read, has acknowledged the right of the men to combine for their benefit, and I think no one now will advocate the mistaken policy of attempting to stamp out these unions by individual acts of tyranny against their members. I have found, in conversation with many eminent agriculturists, that they accept the unions as a happy alternative from smouldering discontent. It must depend much into what hands the unions fall. If the public-house is to be their centre, and their object lip-work, and more time and money to spend there, most evil results will accrue to the agricultural interests. If, on the other hand, the agricultural labouring class is to gain a sense of greater responsibility, we shall have no reason to regret their introduction. Well, how must the question of farm labour be met? First, by the good sense of the employers and the moderation of the employed. This has so far kept agricultural strikes outside this county, and I cannot congratulate you too much on the fact. Second, landowners and tenants must not wince from looking into the condition of their labourers, not by the standard of twenty years ago, but by the advantages which other trades offer the labourer. The condition of the agricultural labourer has been described as somewhat worse than a helot of antient Greece, a Cuban slave, or a Russian serf ; no doubt the opposite case has also been exaggerated. But let him before he turns and rends the hand which has supported him all this time, at the bidding of new found friends, whose sincerity he has still to prove, examine his present condition. Let him inquire whether he has been really cheated of his fair wages through all these years, before he lends a too willing ear to agitators and exaggerators jealous of all those connected with land. I mean, whether he has justly been paid for the work he has done for the farmer. For this purpose let him turn

first to what the agricultural wages in other civilized communities are. Mr Stanhope lately published in the *Times* a most useful statement, in which he shewed the rate of agricultural pay and purchase power in other countries. It is compiled from the reports of Her Majesty's Consuls, and from my own knowledge these public servants expend great pains on being as accurate as possible. By these reports it is shewn that the farmers of England have been paying a higher rate of wages than the agricultural labourer has received in any other country of Europe. (Cheers.) A farmer has informed me that he calculates the average wages in this country at £1 a-week, including harvest. Well, I can only say that if it is so the agricultural labourer is better paid at home than if he emigrated to South America, for at the River Plate I am told English and Irish farm labour is paid 18s. per week. This, then, is the injustice the English peasant has received at the hands of the British yeoman! Now let him glance for a moment at the condition of the peasant owning or renting so much land as he can cultivate by his own exertions. I suppose the best example of this is to be found in Belgian and Flemish cultivation. I believe it is estimated that the Belgian peasant farmer is able to pay himself £35 a-year, in which case our English agricultural labourer is the better off of the two, while the anxiety and risk of the former is much greater. (Cheers.) I cannot but think, after the letters I have received, that the question of wages proper is an unwise one to discuss here. After expressing himself in favour of payment in kind, the noble duke went on:—If the labourers press the farmer too hard on account of wages, he must either farm in grass with fewer hands or give up farming to save ruin. The agitators say that increased wages must come out of the rents. This means, I need scarcely say, the depreciation of landed property in this country. One cannot suppose for a moment that those who last year bought land and will now submit, without a struggle, to have that investment depreciated. The real question will ultimately be whether the loss

is to fall on the consumer or the producer. Eventually, to my mind, the consumer will suffer, as no man will go on producing at a loss. We cannot at the same time shut our eyes to the fact that the farmer's trade is the least able of any to withstand a strike, but one on which a union of men might place an unfair pressure. I cannot imagine, however, a more wicked course than for labour in a district to run the risk of a harvest being lost to snatch a momentary advantage of their employers. I need scarcely say that the farmers of this district are in a peculiar condition. They have to encounter a large demand for colliers and other trades, and the farmers of the district, are, so to speak, jostled against the coal-pit and manufactory. Men are daily enticed away by greater pay. His Grace went on to say:—What we can usefully inquire into is how we can counteract the movement of the agricultural population into the towns and to colliery and other employ. This must naturally have the effect of making agricultural labour scarce and dear. Lord Ossington, speaking to his tenants of the means of retaining a sufficient supply of labour for the land, pointed out that for the sake of convenience, farmers had given up the old plan of having farms servants in their houses, said, "You cannot have a trade without apprentices. You take boys to make seamen of for your navy. If you do not offer comforts to remain and instruction to the youth of the agricultural population, what are you to do when the present generation has passed away?" I merely wish to throw out this suggestion, but I do so with the greatest diffidence, knowing that gentlemen around me are practically engaged in agriculture. I think owners and landlords should supply every farmer with a number of comfortable cottages for such labourers as he has constant work for on his farm close to their work. I was surprised to find a letter signed "S. G. O.," a gentleman who writes to the *Times* with great effect, in which he said that whilst the squire's house had become a palace, and great improvements had been made in the dwellings of the

er, the blot on the village was the
rer's cottage. I can only say that as
improvement has been made in the
of new cottages erected for labourers as
e dwellings of landlords or farmers. It
work of time to rebuild labourers' cot-
and to sweep away old ones. Having
red to the subject of life estates and the
ulties there were in applying such a
iple, his Grace went on to say :—The
ord must do this—he must put up
es for the labourers, and that will do
to relieve the present question of agri-
ral labour. I cannot refrain, however,
reminding you of an excellent obser-
n made by Lord Palmerston at a
ing at Romsey, in Hants. Some one
“ Oh, but good cottages cannot be made
y,” to which Lord Palmerston replied,
at is not the right way to look at it ; any
eman who is so fortunate as to possess

a landed estate does not hesitate to put up
good stables for his cows, good styes for his
pigs, and they ought still more to build good
cottages for their labourers, the moving power
without which nothing could be done.” When
all these things are done, continued the
noble duke, when we meet some of the re-
quirements of the labourer, I trust this ques-
tion will arrive at a settlement. If the
labourer continues to claim more than is his
in fairness due, then no doubt something will
be done among farmers, I hope that these
Chambers of Agriculture will unite farmers
together as a class, not for the purpose of
underselling each other, and not that they
may be like a rope of sand, but that they
may be united in improving the state of agri-
culture, and feel that they are one of the
greatest and most important trades in the
country. By that means they will be doing
good to themselves and to the public.

PROFESSOR FAWCETT ON AGRICULTURAL LABOUR.

ROFESSOR FAWCETT, M.P., unlike
the weasel, must have been napping,
he penned, in *Cassell's Magazine* for
these words in reference to the report of
Commissioners appointed to inquire into
condition of women, young persons, and
ren employed in agriculture :—“ How,”
es, “ can the condition of all the members
family be investigated, if no account
be taken of the father of the family, his
s, his intelligence, his sobriety,” &c. A
1 years ago there was a return presented
liament, of which Mr Fawcett was not
a member, setting forth the wages re-
l by agricultural labourers in England.
awcett, before discussing the condition
e agricultural population in England,
d have informed himself on this point.
nquiry into the condition of the agri-
al labourer and the desire to improve
not one of to-day—although sensational-
g after popularity by many persons

would induce those who have previously
taken no interest in the question to believe
so. Long before Mr Fawcett entered Par-
liament—Parliament, importuned, had taken
up the subject of the wages of agricultural
labourers ; and the returns, we believe, were
tolerably accurate. For the benefit of those
who, like Professor Fawcett, do not appear
to know of the existence of such a return, and
in order that it may not be moved for again (Par-
liamentary men are not very economic in the
matter of printing, when it costs them very
little, but the country a not inconsiderable
sum for matter that is often useless—witness
the ponderous Blue Books to which the late
member for Edinburgh, Mr Adam Black,
called attention), we shall here give a brief
summary of it.

In Surrey, during the Michaelmas and
Christmas quarters of 1860, the weekly wages
of men ranged from 12s. to 14s. per week, and
a certain allowance of beer was given during.

hay-time. The reaping of wheat was let at from 10s. to 14s. per acre, according, as it may be presumed, to the state of the labour-market; and mowing was done at a cost of from 5s. to 7s. per acre. Of course in these days of reaping and mowing machines such work is not wanted. Women's wages ran from 5s. to 6s. per week; and children, under sixteen years of age, made from 2s. 6d. to 7s.

There was a wide divergence in the weekly wages of men in Kent—from 8s. 8d. in the Faversham district, to 15s. in Romney Marsh. The quantity of beer allowed was liberal enough during harvest-time, viz., a whole gallon, and in hay-time half the allowance was granted. Women and boys received about half the quantity of liquor, which was surely more than *quantum sufficit*. The wages of women were as varied as those of men, from 2s. to 6s. and 8s., and children made from 3s. to 6s. per week. The rents of cottages in Romney Marsh often amounted to 2s. per week, but there was, in most cases, a small garden attached.

In Sussex, men received from 11s. to 12s. per week; women from 3s. to 6s.; children under fourteen made from 2s. 6d. to 4s., with beer in haymaking and harvest times.

With reference to beer, it is curious to note that the estimate of the capacity of women and children to drink varies in different counties. In some places they are allowed, as we have seen, half of the quantity deemed suitable for men, in others only a-third, and in some cases, only half the amount granted to children is permitted to women. The latter must surely in these parts be very susceptible of intoxicating influences, or the young ones very seasoned.

In Berks, the wages range from 9s. to 15s. per week; women from 4s. to 5s.; and children from 2s. 6d. to 5s., according to skill and industry. Beer was allowed during hay-time, and in the season of the hoeing of turnips, from 6s. to 8s. was the price paid per acre.

10s. per week was the amount given to Hertfordshire workers, in addition to beer during harvest and hay times. Women were not very well paid for their out-door labour,

receiving only 3s. 6d. per week, the privilege of gleaning brought them £1 to £2 in the season in good years; year's gleaning cannot be so profitable as was before the introduction of machines. Children made 2s. 6d. per

In Northampton, the wages of men from 10s. to 12s., women being rather remunerated than in Hertfordshire.

In Huntingdonshire, 10s. to 11s. were for men, and about a-third of that for women and children under sixteen; the latter were classified in the returns as of about equal value to the farmer of the county.

In Bedfordshire (the agricultural progress of which have been so much promoted by the Messrs Howard, not alone by the introduction of improved implements for tilling the soil, for which they have justly acquired so great a fame, but also for setting a good example in the county of breeding such as the Oxfordshire Downs, and pig-wages, in 1860, were for men from 10s. to 12s. Few women were employed in field-work in this county, and children under sixteen ranged from 2s. 6d. to double the wages of men per week.

In Cambridgeshire, the men received from 10s. to 12s., with beer-money during five weeks in harvest; in Suffolk, from 9s. to 11s. 6d. in some parts to as high as 13s. per week in others. During hay-time the wages ranged from 10s. to 2s. 6d. per day; in corn-harvest from 3s. to 4s. per day, with a couple of pence for beer. From 10s. to 11s. were the wages for men per week. Wiltshire and Devonshire labourers are each set down at from 10s. to 12s., and the Devonshire men were at from 8s. to 12s. In Cornwall, the wages were from 10s. to 12s., the increase in Wiltshire and Dorset being doubtless owing to the outlet for surplus labour there afforded. Gloucestershire farmers gave men from 9s. to 10s. weekly, with cider; a similar rate of wages prevailed, with little difference in the perquisites, throughout Herefordshire and Shropshire, Worcester, and Warwickshire.

Wherever we find other industries encroaching upon or rather assisting agriculture, there we find wages higher, shewing that the amount of supply and demand holds good everywhere and among all trades. In Staffordshire, wages were then 13s. per week. In the West Riding of Yorkshire, 13s. 6d. to 16s.; in the North, from 14s. to 15s.; in Lancashire, 13s. to 15s., and in hay-time and harvest the best hands realized from 15s. to 18s. per week, with food. In Durham, the wages were 13s. 6d., with a free house for the hinds, with an addition of 20 bushels of potatoes, and if they chose to buy their wheat from the farmer they had it at a very moderate price. In Northumberland and Cumberland, the wages amounted to about 15s. per week; and in Westmoreland, the Kendal district, as much as 18s. per week was given, but this was an exceptionally high rate, the average for this county being set down at 12s. per week.

From these figures it will be seen that one cause of complaint made by Mr Fawcett was removed long before the inquiry which forms the ground-work of his essay was undertaken. There was certainly nothing said in the returns about the intellectual capacity of the labourer, or of his habits and the nature of his accommodation. In noticing it at the time it was published, we suggested "that the next return of this kind should embrace, in addition, the hours of labour and the character of the labourers' cottages."

Having corrected Professor Fawcett in reference to the rural labourers' wages, we must thank him heartily for his article in *Cassell's Magazine*. It is written carefully, it is written with a due sense of what is right between employer and employed, its tendency is to draw the bonds of relationship between the agricultural classes closer than they have ever been before, rather than, as town-agitators wish, to loosen or to sever them altogether. The Professor strikes the right nail on the head when he declares the want of education to be the primary cause of all the grievances the agricultural labourers are supposed, and said to be labouring under. It is the lack of education that makes

many agricultural labourers prefer living in a hovel to a comfortable home. From our own inquiries we can without hesitation endorse every word in the following paragraph:—"The matter of cottage accommodation becomes still more perplexing when it is found on inquiry that the labourers themselves, in their present ignorant condition, do not appreciate the advantages of healthy and decent dwellings. On some estates landlords have made an effort to improve the character of the cottages, but they have too frequently found their well-meant attempts are rendered abortive by the apathy and ignorance of the labourers. One landlord says:—'We have given a very good cottage to the labourer, and we find he does not appreciate it at all. He puts his apples into one room, does not inhabit another, and would put his pig into another if we would let him.' Other landlords speak of the difficulty they have in finding tenants for new and well-arranged cottages; the labourers prefer remaining in places 'where you would hardly put a pig to live.' Another witness of authority states that in several of the cottages with two bedrooms, the father, mother, and children are huddled into one room, and the other bedroom is let to lodgers."

Now, what are landlords and farmers to do under the circumstances? It is, as Professor Fawcett says, very perplexing; but the landlords and farmers who have built or assisted in building such cottages are yet far too few. There is still a great want of good cottage accommodation in the rural districts which ought to be supplied, and where this is lacking, landlords and farmers, conjointly or singly, as arranged, should not be deterred by the failures of others from providing for this deficiency. It is their duty to remove all complaint in the matter of housing, just as it is for a humane man to take a horse long abstinent from water to the pond. If the horse is obstinate and will not drink, and suffers in consequence, the responsibility attaching to cruelty is removed from the head of the master.

On the matter of education, we cannot quite agree with one of Professor Fawcett's

witnesses, who throws cold water upon night schools, because, according to his judgment, they have a tendency to keep back parents from sending their children to day schools,—the thought being that the wages the youngsters bring in will be of present use, and that, in prospective years, they can obtain the desired learning at their own expense.

We have a higher appreciation of night schools in the agricultural districts. We have known many field workers who have risen to much higher positions than they could ever have attained except through their beneficial agency. Instead of having a wet blanket thrown over them, they should everywhere be encouraged; and we are quite sure that in the localities where they flourish most, the day schools will be most prosperous. The night schools in the Carse of Gowrie, instituted by Lord Kinnaird, sufficiently prove this.

Professor Fawcett often refers (be it understood he is speaking of England alone, and takes no note of Scotland, where the hinds are better educated than in England), to the excellent state of education in Northumberland as contrasted with that prevailing in many other rural districts, and points out that even in this comparatively enlightened county no degradation attaches to women labouring in the fields. On this point, about which there has been a great deal of nonsense spoken, we cannot do better than quote his words:—

There is another circumstance which has not yet been referred to, in which education seems to have made the Northumbrian labourer a "morally and physically superior animal." From other parts of England, complaints are frequently heard as to the demoralizing effects of the employment of women in agriculture. With some (so-called) philanthropists it seems to be an almost universal rule, when immorality prevails among those employed in any industry, to appeal to the fact as a conclusive reason why women should be debarred from engaging in that industry. Thus, when statisticians quote the number of illegitimate births in the agricultural districts, they sometimes appear to think that no other argument is

necessary to prove that women should not be allowed to work in the fields. They forget apparently that every illegitimate child has a father, and that a high percentage of illegitimate births in rural districts affords no more reason for excluding women from agriculture than men. It may perhaps be replied that, according to strict ideas of justice, there is no reason why the one sex should be excluded more than the other, but that the exclusion of women would be justified by expediency, the labour of women being of so much less economical importance than that of men. In reply to this argument of economical expediency, the Commissioners state that in some districts many branches of agricultural industry would be entirely destroyed if any restriction or interference were put upon the labour of women. Speaking of one district, one of the Assistant Commissioners says, "To prohibit female labour would be to prohibit farming. It is, however, desirable that the question of the employment of women should be put upon higher grounds than those of expediency. Every woman has the right to labour honestly to get her own living; it would be the height of injustice to treat her as if she were a child, and forbid her to engage in any particular work, because some of the men and women who have been employed in it have had immoral connexions with each other. And let the sensitive conscience of the moralist who would shut the door of honest toil to women be reminded, that it is the difficulty of earning bread which even now often sends a woman to a life of degradation. Food must be had, and more, women will seek it in the streets if they are driven from the farm and workshop. In Northumberland, where the condition of the agricultural population is more satisfactory than in any other part of England, women are very largely employed in agriculture. Nearly all unmarried women are engaged in field-work, and the practice is not found to be attended with any moral or physical evil. They are well and suitably clothed, and their labour appears to have the effect of making them peculiarly robust and strong. Mr Henley describes the good manners and the good management of the married women, as conclusive proof that farm labour has no deteriorating effect on women. The refinement which education has given to the Northumbrian peasantry is sufficient to prevent the coarseness and immorality which field-labour is said in some instances to produce.

We are hopeful that this sensible paper, coming from one who is recognized as a friend of the labouring classes generally, will have good effect among the agricultural labourers at the present crisis of their history.

BOARDS OF AGRICULTURE.

a meeting of the Darlington Chamber of Agriculture lately—Mr S. Rowland, in the chair, the practicability of forming boards of Agriculture, to watch the agricultural interest in the country, was discussed.

W. Good introduced the subject with the following remarks :—

There was no doubt that many serious difficulties were arising in connexion with agriculture in this country. The subject of diseases of stock was becoming daily a matter for the consideration of consumers as well as farmers. Cattle diseases were increasing, and this would not be stopped by proper Governmental regulations, unless farmers organized themselves in some way in order to bring pressure to bear upon the Government. Then there was the agricultural labour question. No one would deny that it was desirable that the position of a large number of farm labourers should be improved. But it was unfair that the tenant-farmer should have to bear the whole burden of increased wages demand, while they themselves remained with their hands tied as to the investment of more capital and safety when spent on the land they hire. Any movement on the part of the labourer, however, would not prove to be so great an advantage as many farmers anticipated, for it would only create much discussion and some dissent among the leaders of the "country party;" and if it led to that reform in land laws which was so much desired, the farmer himself would be well repaid for the increase of wages which it was possible for servants to obtain.

SETTLEMENT OF THE LAND QUESTION.

W. Good then dwelt at some length on the subject of compensation for such unimproved investments, as the application of new manures, the feeding of stock with cake and corn, drainage, and so on—

when these costs have necessarily to be incurred by tenants. He had given, he continued, considerable attention to the subject of boards of agriculture, and he was quite satisfied that nothing could be done until they had some organized system to embrace the whole of the farmers in the country. He had brought this subject forward at the Newcastle Farmers' Club, but they did not take the question up cordially; but he believed this was attributable to the influence of the landlords and their agents. In fact the agents and landlords of Northumberland and Durham seemed to set themselves dead against what might be termed the great land question; and that movement was of a political character of the narrowest order; or in other words, the farmers of the north of England were looked upon as the instruments for the return of certain people, Whig or Tory, as the case may be, to the House of Commons. It was said that the tenant-farmers wished to dictate to the landlords. He did not see there was any dictation when it was merely suggested that the tenant's capital should be secured to him when he had sunk it in land belonging to some one else; and that this should be done by mutual agreement. He was sorry that the landlords and agents did not see that it was to their advantage to have the matter settled amicably, for it would be done against their wish by agitation if they did not change their policy. He quoted from the speech of the Marquis of Lansdowne, in which he stated, with regard to the compensation to tenants, if it was right for Ireland it was also right for England and Scotland, and it would inevitably become the law of the land. He then read extracts from letters he had received. One from Tamworth, Staffordshire, said that they had at Stafford a committee of six landlords, two agents, and seven tenants for deciding such questions, and if tenant-right was

suitable for that county it was certainly good for the country. One of the landowners who formed this committee was the Earl of Lichfield, a nobleman who was as far-seeing as he was anxious to do the best he could to improve the position of his tenants and neighbours generally. The other landowners of this committee were equally ready to acknowledge the desirability of having some code of rules established for governing the letting and hiring and entering and quitting farms. This committee, Mr Good said, he had never heard of till lately, although he had a full recollection of the result of a prize for a "model lease" which was offered by the Earl of Lichfield a few years ago. From the letter, however, of one of the tenant-farmers on the committee, it appears that his (Mr Good's) proposal for boards of agriculture contained much matter which had been talked over by them a year or two ago. But the subject and its details were merely left in a crude form, and in that condition it appears they still remain. This was just the stage to which he arrived over and over again, and it was only when he had an opportunity for giving special attention to the subject, and hit upon the idea of electing a board or a standing committee with agricultural assessors for each County Court district, he saw the practicability of carrying out this system in every part of the country.

CONSTITUTION OF AGRICULTURAL BOARDS.

The "*Tenant-Right*" cry was one in which he had never joined, as it was one which could not be dealt with satisfactorily by the Legislature, and it had only been resorted to as a clap-trap term by men who wanted to gain the ear of farmers, but from not having any practical knowledge or judgment, they had simply created a strong prejudice against the cause which they affected to advocate. As he said at Newcastle and Chester-le-Street, we do not want the Legislature to deal with details, as that would be impracticable with the hundreds of variations in the "customs" which are necessary in this country. But

what we do want is a plain system of self-government, by the formation of boards in each district for defining customs, with a simple Act of Parliament to make it lawful for the members of the said boards to act as agricultural assessors in County Courts, the judge, of course, being present to put a proper legal construction on any technical points that may arise in causes that are being tried. The land question and farmers' difficulties, and the farm labourers' unions, were questions that are daily cropping up in every circle of society, and he believed that if farmers were much longer checked in their desire to gain the required freedom of cultivation and security for capital invested, they would begin to look with favour on agitators whom they now avoided, when a more radical measure would be carried than the best friends of this country could countenance. He did not think Chambers of Agriculture had accomplished the work they might have done had their constitution been different. He suggested that the Chamber should appoint a provisional committee, that should draw up a code suitable to the neighbourhood; and at the same time consider the advantage of boards of agriculture, how they may be elected, and the advisability of members of boards being eligible to act as agricultural assessors, so as to assist County Court judges in trying cases affecting agricultural interests.

In conclusion, Mr Good repeated that if a wholesale measure was passed under the pressure of agitation upon what was termed "*tenant-right*," it would then be necessary to have these boards for arbitrating where possible, and for supplying agricultural assessors when cases could not be settled out of court. If this were not done, the country, as regards landlords, tenants, and labourers would be thrown into a state of confusion, the least of which would not be their hostility towards each other. On these grounds he hoped this subject would be discussed, and the question amicably settled without that interference by outsiders which was sure to come unless men of practical judgment took it up themselves.

THE ROYAL AGRICULTURAL BENEVOLENT INSTITUTION.

LIGHT in crops and losses in stock,"

"disease in cattle, and low price of agricultural produce," and many causes of a character, tend to reduce the circumstances of tenant-farmers considerably. In going over the report of the Royal Agricultural Benevolent Institution, we come upon names of many farmers who have suffered so seriously from the causes above mentioned, that, coupled with their declining strength, they have been compelled to throw themselves on the charity of their brother agriculturists. All professions are more or less liable to misfortune and failure; but that farmer stands alone in its precariousness from causes, too, which unlike many of which lead to failure in commercial undertakings cannot be controlled. And British farmers are certainly more liable to failure and misfortune than those of other countries by reason of climatic and atmospherical variations, which agriculturists in France, Spain, &c. many know nothing of. Hence the names attached to the names of many recipients of the bounty of the Royal Agricultural Benevolent Institution, such phrases as "disease in crops and losses in stock," "heavy and unfavourable seasons," "heavy losses through floods," "succession of bad seasons," "adverse circumstances," &c.

There are many acts for which Mr Mechi might be remembered, but there are few which will bring kindlier association of benevolence and humanity to the mind than that at which he was the originator of this Institution. With that foresight and goodness of heart which in spite of the attacks and calumnies of his detractors, have invariably distinguished him, he conceived the idea that a large agricultural portion of the population did not possess one of these charitable institutions in which we find so many other branches of benevolence possessed. The conception of such a plan was said, did not require any great effort of mind; it was patent and plain to the eye, and standing out with a prominence which

was rather detrimental to the reputation of agriculture. The manner in which he put his idea into practical form, however, claims for him not a little credit.

The Society at present may be truly stated to be in its infancy, having only been in existence for twelve years; yet, notwithstanding its short term of vitality, it has ramified throughout the length and breadth of England with astonishing rapidity—a rapidity which involuntarily begets the notion that such a scheme only wanted a beginning to enable it to take root in the country. Farmers, as a rule, when appealed to for any charitable purpose, are, in spite of their reputation as "grumblers" and "screws," amenable, as well as other mortals, to benevolent sympathies. Witness the great success of Lord Vernon's effort to secure the crops of the French peasant farmers during the late disastrous war on the Continent. And what, if they are willing to lend a helping hand to the foreigners in distress, should be their action in the case of distressed members of their profession, belonging to their own nationality? Just exactly what it has been. The growth of that "precocious child of Mr Mechi's," as Lord Vernon has happily termed it, has shewn a rapidity which is only equalled by its healthful appearance; it has increased its original capital an hundred-fold, and at the present time, unchild-like, is able to support not only itself, but two or three hundred farmers, their widows, and children. There is a standing fund of £20,000, and the donations and subscriptions which were received from December 1870 to the like month of 1871, reached the handsome total of £10,267, os. 3d. Such facts as these conclusively shew whether or not our farmers are impervious to kindness or charity.

The twelfth annual festival of the Institution, which was held at Willis's Rooms, on Wednesday, June 5, under the presidency of Lord Vernon, was, as Mr Mechi observed,

not so well attended as certainly it ought to have been. However, what was wanting in numbers was fully made up by the enthusiasm of the gathering. The speech of the noble chairman contained much instructive advice which, we have no doubt, will bear good fruit. The suggestion with respect to the holding of the anniversary festival in the district where the Show of the Royal Agricultural Society of England is held, or on the occasion of the Smithfield Club Show, is an excellent one, and which, if adopted, would inevitably ensure an attendance of members worthy of the Society. Again, in many counties in England, the Institution is altogether, or very nearly, unknown among farmers, and consequently the subscriptions from these are nothing to speak of. This, of course, can be easily remedied by the increase of the local agencies, which, we notice, is gradually taking place, and there can be no doubt that the donations and subscriptions will be considerably augmented by such a system. There were some slight expressions of dissent among the gentlemen, when Lord Vernon touched

upon the expediency of reducing the figure of the qualification for voting, and we gather from that that the present standard is low enough. Of course, the members themselves should be their own judge in such a matter, and if they think the present sum adequate to secure them a sufficient capital to extend their operations, we have no doubt that they are right. The suggestion of the relief of agriculturists in momentary difficulties was an excellent one, and we hope to see some good result from it. For instance, by cattle disease, many farmers lose frequently a considerable sum, which, if advanced to them, even for a short time, would in many cases avert disastrous consequences. It may be well to state that Her Majesty the Queen, who, along with her illustrious children, invariably shews an interest in and sympathy with farmers, is patron of the Institution, and subscribes a yearly sum, as also does the Prince of Wales; and the Duke of Richmond is president. The donations during the past year amounted to little short of £6000.

AN AMERICAN VIEW OF ENGLISH FARMING.

IN an address lately delivered to the farmers of New Jersey, in the United States, by the Hon. James W. Wall, he alluded to the enormous increase which has taken place of late years in the agricultural produce of England. Less than a century ago the entire production of wheat in this country fell short of 16,000,000 bushels. In 1870, the yield exceeded 100,000,000, averaging 30 bushels from each acre devoted to this staple. Mr Wall pointed out the direct agencies by means of which this increase was brought about by English farmers.

In the first place, he said, it is to be found in their systematic attention to all the requirements of good farming, in the skill and exactness with which all the operations of ploughing, harrowing, clod-crushing, burning,

and scarifying are performed; in the perfect condition of "tilth" to which they bring the land preparatory to the reception of the seed; in their careful selection of the best varieties of seed wheat; in the extensive and prudent use of their barn-yard manure; in the perfection of all their instruments of tillage; in the strength and discipline of their draught animals; in the assiduity with which they extirpate every weed and remove every rock that can interfere with the cultivation of the land. Nothing is left to casualty or chance. No expectations are indulged that the bounty of Providence in an unusually favourable season will atone for their shortcomings or neglect. Everything which human foresight, scientific skill, intelligence, well-directed labour, and

mechanical aid can accomplish is done, to ensure the highest yield from the land. It is next to be seen in the extraordinary liberality with which they restore to the earth, by means of purchased manures, all those elements of fertility which are exhausted in the process of cultivation. It is estimated, by chemical analysis, that wheat absorbs 40 of every 100 parts of nutriment contained in the soil. Now some idea of the enterprise of English agriculture may be formed (added Mr Wall) when I state to you that in a single year, the year 1837, the first year of its general use as a fertilizer, the foreign bones imported were valued at the Custom House

at 1,500,000 dol., since which time it is estimated that the amount paid for imported bones alone amounted to 150,000,000 dol. Since 1841, upwards of 1,500,000 tons of guano have been used.

Mr Wall also spoke in high terms of our system of drainage and the rotation of crops. "I believe," he remarked, "that nothing more perfect in rural economy can be conceived than their rotation of root and grain crop. The root cultivation has indeed been the salvation of England. With as much truth as force has it been said that the power of the British Empire rests upon her coal, her iron, and her turnips."

STATUTE HIRING, OR HIRING FAIRS.

IN connexion with the present movement to advance the pecuniary interests and general well-being of the agricultural labourer by means which, as we have already pointed out, we consider injudicious, and by the quotation of figures which have been proved erroneous, we think the subject of statute hirings one of considerable importance.

These fairs, or statutes, as we have before had occasion to point out, originated at a time when the labourers were legitimately asserting their right to more wages. The labour market had been fearfully cleared out by "the plague." Shepherds and ploughmen, reapers, cowherds, and horsemen, had been ruthlessly ridden over by that stern entity on the white horse, whose name is Death. Naturally, those who survived wished to obtain higher wages for their work. They felt that farmers could not get on without them, that the field of labour to draw from was so circumscribed that they could command their own terms. Their notions of supply and demand were doubtless of a very crude character, proceeding more from instinct than reason; for political economy at that time had little been thought of—far less elevated into the dignity of a science.

But those days were not as our days. Liberty of individual action did not exist, and the poor labourer, who, in the period in which we now live, under such circumstances, would without effort have obtained an increase of compensation for his toil, was, under penalties, forced to present himself in market places with symbols of his particular branch of agricultural occupation around his hat, or on his breast, and take such money as the farmer decreed. It is strange, seeing that statute fairs were instituted to the disadvantage of the rural labourers, that they should be so disinclined to have them abolished.

The scenes at hiring fairs are of the most disgraceful description. Men and women stand upon the streets, and submit to criticism of the same kind that we hear about cattle at agricultural exhibitions. They are judged upon present form rather than upon past performances. Style instead of character is the basis of their engagement. To this mode of hiring the frequent changes of ploughmen and domestic farm-servants in many districts may be ascribed. The farmer, as a rule, knows nothing whatever about the capabilities of the servants for the work they have undertaken, whether it be in handling a plough or

a churn, or in taking care of stock. Of their general behaviour and good conduct the farmer has often no more guarantee than that which is afforded by deportment in the market-place at the time of inspection. Consequently it often turns out that the servants are altogether unsuitable—that they are incompetent, insolent, or morose, and the bonds between master and servant are severed before next hiring fair. On the other hand, good servants are often as careless as masters in making inquiries about the employer, and the result is that they find out in a week or two that the place they have taken for a slightly increased wage in the year, or half-year, is intolerable, and leave on the first opportunity. The testimony of all who have been uninterested, philanthropic observers of the doings at hiring fairs is unanimously against their continuance.

The agricultural labourer, speaking generally, has not such an inordinate appetite for beer as alleged by some recent speakers and writers; but at statutes he certainly does indulge to an extent injurious to himself, and inimical sometimes to the comfort of the peaceable lieges of the village or town where he attends to make his engagement. The worst feature of the fair, however, is not the drunken men, but the half or wholly intoxicated young women whom one sees on the streets after they have accepted their arles. The result of these gatherings is not a pleasant one to contemplate in the returns of the Registrar-General.

For many years efforts have been made to substitute register offices for meetings in the market place, but without much effect. The farm servants seem as adverse to state their qualities in a book, as farmers who have been in the habit of standing on the street for the transaction of business are to enter some new corn exchange specially erected for their comfort. They appear to fear more for the chance of losing a holiday, than for the loss of their character, or for its deterioration, through the fact that it cannot possibly be properly appreciated by the exhibition of themselves on the public thoroughfares. Farmers, also, with some exception,

are very half-hearted in the matter, many of them apparently enjoying a fair day after the same fashion as the persons they engage.

This subject was recently discussed at the Penrith Farmers' Club, and we are sorry to say that, notwithstanding admirable speeches in favour of the abolition of statute hirings made by several members, a large majority of the club approved of the old bad method of engaging their servants. Mr Crosby, who opened the discussion, put the whole arguments against them in a nutshell. We cannot do better than here quote his words. He said:—"There was nothing to correspond with statute hirings in any other industries, and there were many evils incidental to the custom. It lowered the self-respect of the servants, especially women, to make them wait hour after hour in a market place for employers, as if they were so many cattle. Farmers or their wives would not like it: and if the servants had not self-respect enough to dislike it, they ought to do all they could to awaken such feelings in them, for then they would be more likely to respect their masters and do their work in a conscientious and intelligent manner. It was impossible, in a hiring, to form an intelligent opinion of the servants engaged, and inquiries had to be made afterwards, which was rather like buying a pig in a pock. The servants adopted the same senseless method, and sometimes sent back the earnest money, saying they had changed their minds, or went to their places in a very dissatisfied spirit. But if the engagement were a matter of private negotiation, inquiries would be made beforehand, and many of these disappointments would be avoided. Servants, also, would be more stationary, and would not be so much tempted to change by being brought face to face with so many fresh masters every six months. He looked upon this constant changing as a great evil, so far as work was concerned. So soon as they had adapted themselves to the master's ways of doing the work, they left, which led to farmers being bad tempered; and the short terms made servants careless of their masters' interests, which ought not to be."

Mr. Thom, corroborated Mr. Crosby's views, and in reply to the argument for the continuance of statute hirings, that they afforded opportunity for friends meeting, said that better means of renewing friendship was provided by cheap excursion trains at certain periods of the year. Mr H. Newby Fraser spoke of the evil we have alluded to—that of the great amount of illegi-

timacy arising from the indiscriminate mingling of the sexes at fairs.

There are no doubt some difficulties in the way of establishing register offices in the rural districts, but these are not insurmountable if farmers would earnestly unite to overcome them; and doubt there cannot be that hiring fairs are sad blots upon the agricultural sheet of the social system.

HOW TO INCREASE OUR MEAT SUPPLIES.

THE subject of meat being really one of the most important of the day, we gladly notice a proposal that has been sketched out for increasing the stock in our own country. It is contended by the author that Englishmen will never take kindly to beef in tins, however excellent its quality may be—that what they crave for is a fresh juicy joint from a well fed home-bred bullock, and there is no doubt much truth in what he states. It is also asserted that the time must come when Australia will require the whole of its butcher-meat for its own population, but the resources of that country are so great in the way of cattle raising, that we need not fear a scarcity in our day, even if the imports were to go on doubling every year.

How does the writer propose to supply the deficiency of stock which is yearly growing greater, not only in proportion to the increasing ratio of the population but in actual numbers? He would, he tells us, go “to the lakes and streams—to every place where water can be obtained or stored, in order that we may apply it to the land at the time when it is most required, as a certain means for transforming the mineral and organic substances concentrated in the form of guano and other manures, into flesh-forming elements by the production of pasture grass. This is, undoubtedly,” he adds, “the cheapest source of food for quantity and quality of both beef and mutton.”

The writer then points to the alarming decrease in our cattle and sheep stock during the last three years, which he attributes principally, and not without reason, to the successive dry seasons, and contends that by the application of water, mixed with manurial substances by means of an irrigation system, which would distribute the moisture gently as a lightly falling shower, there would be plenty of grass to support a vastly increased stock—a stock so extensive, indeed, as to render us wholly independent of foreign supplies. The facts recorded in this Magazine last year about Stoke Park, fully bear out the belief that were a scheme of irrigation, such as there practised, carried out extensively throughout the country, the lands would be greatly improved, would support a very much larger number of beef and mutton producing animals, and so tend to lower the price of this kind of food.

It may be worth while to recapitulate the results obtained at Stoke Park last year under Brown's system of irrigation, as we noted them down at the time. About 430 acres of park and pasture land, when we visited the place, were almost withered and bare after the drought of the summer, affording scarcely any bite to cattle or sheep, while 40 acres of land under irrigation supported 120 large Highland bullocks, at the rate of three bullocks to the acre, from August until November. The bullocks receiving no food of any kind but the irrigated grass, were

kept in a thriving and fattening condition for the time specified, and splendid beasts they were. They would make grand killers. Before the cattle were put on the grass, two crops of hay, estimated at 5 tons per acre, had been taken off the ground.

This year, the like, or even greater productiveness, we are informed, has been obtained at Stoke Park. "Guano manure put upon the irrigated land in the month of March, gave a growth of thick-set grass 9 inches long, which was grazed by the first week in April. The same quality and quantity of manure was applied to the adjoining permanent pasture land at the same date in March, and, notwithstanding the rain which fell, the growth on that land is as yet nothing beyond a change in colour to a darker green." The advantages of the irrigation, it is contended, are "shewn to be in tempering the soil when dry weather came in the end of March and beginning of April, supplying moisture regularly, and in just sufficient quantity to prevent the surface from crusting." The manure was utilized to the fullest extent, and the re-

sult was as stated above, the growth of about 9 inches of grass in about the same number of days.

The permanent pasture of Great Britain amounts to about 40 per cent., and of Ireland about 64 per cent. of the whole surface of the land, and with the application of this system, coupled with the admirable character of its utilization of artificial manures, it is alleged that ground now comparatively, if not altogether unproductive, could be made to yield nutriment for from two to five bullocks per acre, according to quality of land, or from fifteen to twenty-five sheep on the same space of ground; that, in fact, under the genial influences of this system of irrigation, the land could be made to nearly double its productiveness in beef and mutton. While this estimate seems to us a very much too sanguine one, the fields at Stoke Park leave no room to dispute that the effects of water judiciously applied to grass lands are something marvellous; and in connexion with the meat question, the plan sketched out above is deserving of every consideration.

Agricultural Engineering.

ANTI-MILDEW GRAIN PROTECTOR.

AN ingenious apparatus for preventing corn and seed in bulk becoming infected with mildew has recently been patented in London by Messrs Adutt & Co., and consists of an arrangement of perforated and solid tubes, on the principle of the syphon, whereby the air

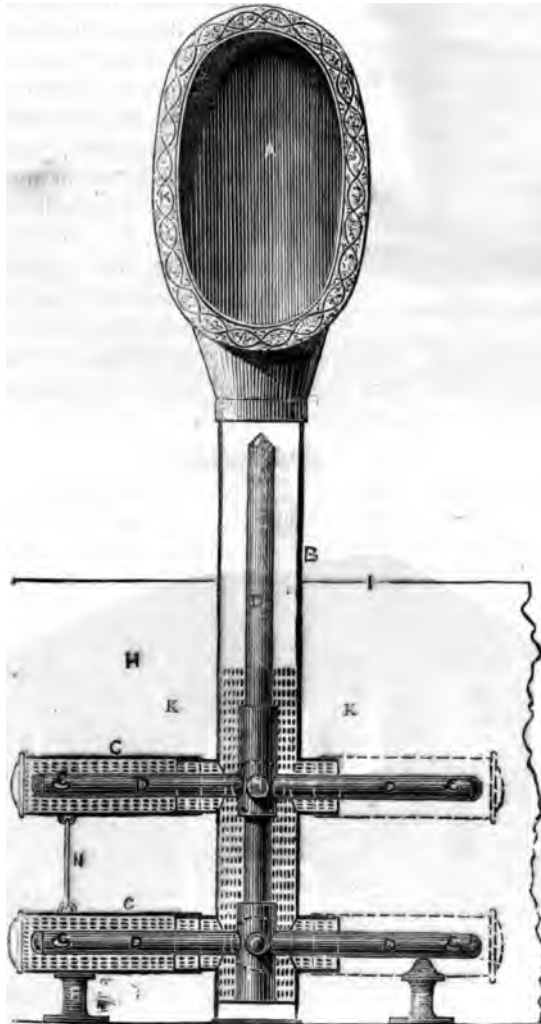


Fig. 1.—Anti-Mildew Ventilator.

is passed through the mass of the corn as stored in the hold of a ship, in granaries, or
 Mark Lane. It is an invention by Mr
 VOL. IX. B

in warehouses. It is well known that the commercial value of cargoes is frequently



Fig. 2.—Anti-Mildew Ventilator.

reduced by a portion becoming damaged, and then, as the samples taken from each

the whole cargo thus really becomes reduced in price. This and many other illustrations which might be given would shew that the prevention of mildew is not only of high importance intrinsically, but considerable expenses might be well incurred to avoid the deterioration of large quantities on the voyage. For hay-ricks, too, a good system of internal ventilation would go a long way towards preventing heat, or in facilitating drying. The apparatus consists mainly of a system of double tubes, one external, and perforated all over; the other internal and only perforated at the end of each branch. The arrangement is as follows :—There is first a vertical perforated cylinder, from which, fore and aft, and port and starboard, perforated arms extend in single or in two or more tiers. The cold air taken in at the bell-mouth of the vertical tube descends, and finds escape partly through its own perforations, and partly through those of its branches, and thus intermingles with the grain through every interspace. When heated, or under pressure in the closed hold, a portion of the air escapes by



Fig. 3.

are mixed by the brokers for disposal in the markets with a view to ensure a fair average,

the internal tubes, and thus a constant circulation is maintained, as may be shewn in the

Anti-Mildew Grain Protector

models by means of smoke. A full-sized machine, ordered for Wallachia, may now be seen at Messrs Rotherall & Bastin's, Blackfriars. In length its tubes are 32 feet, across the ship, 19 feet, the vertical tube being 13 feet, or, in other words, the tubes extend nearly across the hold in both directions; above the hatches the tubing to the bell-mouth will rise some 7 feet. The cost of this apparatus will be about £150; a sum that

The woodcuts, with letter fully explain the working:—

- A—Funnel-shaped ventilator.
- B—Section of perpendicular cylinders or perforations.
- C—Sections of horizontal cylinders.
- D—Interior pipes for keeping communicating with the atmosphere.
- E—Mouth or opening at top of being seen in the drawing, E is p top thereof.

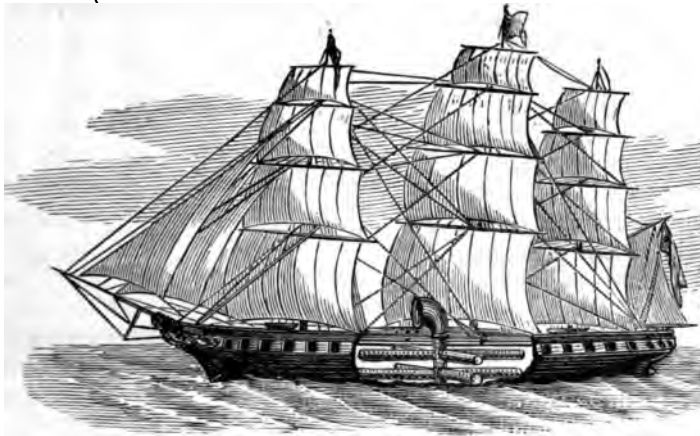


Fig. 4.

might be saved in a single voyage upon an extensive cargo. For granaries and other magazines, where a full current cannot be encountered, as on board ship, a very ingenious Archimedean screw arrangement has been made for forcing down the air into the store amongst the corn. Experience will no doubt shew other advantages and applications. The plan has the merit of simplicity and of working without need of any continuous attention.

F—Standards for supporting lower and apparatus generally.

G—Inner opening of pipes D.

H—A compartment in the ship containing the grain seed, &c., with tubes introduced therein.

I—Deck of ship.

K—Sponges chemically prepared to absorb air as it passes into the cylinders.

N—Supports for the upper horizontal pipes.

A cap is provided for the cylinder, which can be removed when the funnel ventilator is removed.

[NEW METHOD OF FASTENING CATTLE.]

THE Americans are ever on the hunt after novelties, many of which are undoubtedly improvements on old forms or practices, while others have little but their newness to recommend them. We have recently noticed an automatic cattle stanchion, patented in May last by Gifford & Robertson, N.Y., which, promising to be useful, we have thought worthy of engraving. The fastening of cattle with a chain or rope round the neck, with a ring sliding up and down an upright standard, is common and easy of application, but it is not economical of space. The inventor of the stanchion claims for it that it does away with ordinary stanchions out of which cows frequently backed before they could be fastened.

The superiority of a swinging over a stationary stanchion is, says the *Scientific American*, apparent to the most casual observer. This stanchion the inventor styles the "Swinging, Self-Closing, Self-Fastening Cattle Stanchion."

In the common stationary stanchion, it is very difficult for a majority of animals to rise without making several attempts, but in these the yielding of the stanchion allows the shoulders of the animal their natural forward movement, so that the animal can rise as easily as though it were not fastened. The stanchions are hung in such a manner as to allow a sliding or sidewise movement, if desired, by simply shortening the upper and lower transverse bars. The space for the animal's neck is adjustable to any desired width, the bars being slotted transversely where the bolts pass through them, allowing them to be moved either right or left. The stanchions are self-closing and self-fastening, thereby saving a vast amount of time, and any one of them can be instantly unhung without disturbing the remainder.

Fig. 1 is a view, from the stable side, of a section of a row of finished stanchions, one open and one closed. It also shews the

manner of hanging. Fig. 2 is a vertical section of fig. 1, shewing the manner of hang-

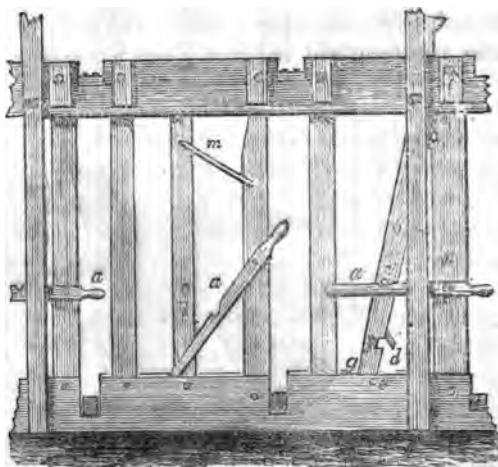


Fig. 1.

ing, also the means of preventing the animal from lifting the stanchion from its bearing,

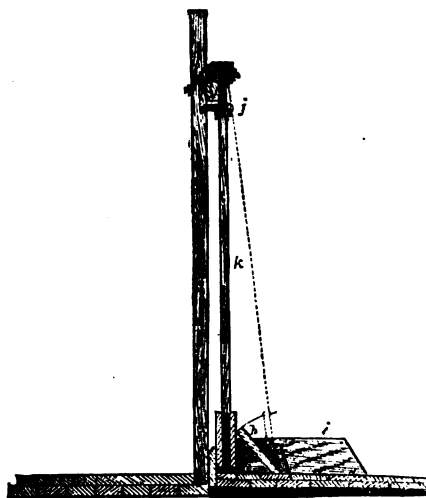


Fig. 2.

by the insertion of the loose pin, *j*. It also shews the construction of the feeding manger, devices for limiting the swing, stanchion,

a board, guide, &c. Fig. 3 shews the interior arrangement of the closing and latching devices, the device for adjusting the space of the animal's neck, and enlarged views of arms, hook-button, &c.

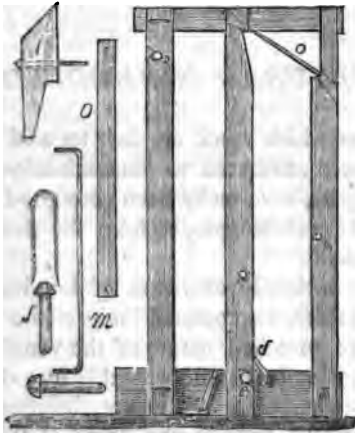


Fig. 3.

To open the stanchion, the attendant presses down on the handle of the lever, *a*, till the upright bar, *b*, is raised and opened, the notch in the lever catches the pin, *c*, and holds it in the position as shewn. The ani-

mal, in lowering its head for food, unlatches the lever from the pin, and the stanchion closes by its own weight. As the bar, *b*, descends, the incline pin, *d*, strikes the pin, *e*, and latches the bar, *b*, in the notch, *f*; *g* is a guide to the bar, *b*, as it rises and falls, *h* (fig. 2), is a loose grain board between the guides, *i*, rocking backward and forward with the swing of the stanchion.

To unhang the stanchion, remove the pin, *j*, from the bar, *k*, and lift the stanchion from its place; *l* is a hook-button made of hard wood, cut in the shape shewn in figs. 2 and 3, to allow the stanchion to swing forward; *m* (fig. 3) is an arm made of $\frac{3}{8}$ -inch round iron, bent at right angles with the keyholes near the ends, the wrists of which pass through the bars, *b* and *n*, fig. 1; *o* (fig. 3), is another form of arm, made of $\frac{1}{4}$ by 1-inch bar iron, with holes near the ends for the reception of staples, by which it is hinged to the bars, *b* and *n*, as shewn in fig. 1. These arms operate to open and close the space for the animal's neck.

These stanchions are simple, cheap, and durable, requiring no iron hinges, and but four bolts in their construction.

The Farm.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

IN the five months of the year that have passed, we have to note a considerable falling off in cattle. In the month, also, the Returns—taking oxen, bulls, and cows in the aggregate—shew that the number is but 9972, as against 18,311 in May of the previous year, when our exports were large, and 12,338 in May of 1870.

This question of the foreign cattle trade is becoming one fraught with great interest to farmers and consumers of stock. Our own home supplies are lessening; the prices of meat are daily becoming higher; complaints are rife that meat is too dear, and that neither salesmen, butchers, nor buyers can make much profit by sales and purchases. It may seem strange, but it is a fact, that the cheaper the commodity the greater the gain. Sir Robert Peel, with that sagacity which belongs only to a few men, though he stood long against Free Trade, saw his error, and became, after the potato failure, the successful apostle of the principle he had contended against; and the most inveterate of his opponents then, will now, we think, admit that although he brought in cheap wheat he thereby improved British farming, and put in rather than took out of the pockets of the cultivators of the soil. Farmers, as a rule, are better off than when there was a prohibitory duty upon the introduction of corn from foreign countries, and have benefited, as well as the artisan, by "the big loaf." We are not arguing that all restrictions should be taken off the introduction of foreign stock into this country. We are fully persuaded that a vast amount of harm has been done to native herds by the injudicious importation of cattle from abroad. At the same time we are not quite assured that all the

diseases which stock are heir to, and which have been attributed to contamination from interlopers, have really been consigned to us from Russian Steppes, or from the flat lands of Holland.

The uncleanly character of London and other dairies, the confined limits of the sheds, and the wretched nature of the ventilation, have not a little to do with that dire disease pleuro-pneumonia. It is not, however, our purpose now to trace the origin of the contagious diseases from which stock suffer, but in this passing way to indicate an opinion that every encouragement should be given to the importation of foreign stock, consistent with safety to our own domestic animals. This, it is thought by not a few people, is not done; hence the decline, it is alleged, in cattle from the Continent. A representation on this subject we understand is again to be made to Mr Forster, whose patience in listening to the representation about the bovine and ovine races, must be something like that which is attributed to Job when he lost all his cattle.

While, however, the imports of cattle have been falling off, an increase is noticeable in the receipts of sheep for the five months, to the extent of 50,000 head; but in the month, although at this season of the year we might have expected an increase, there is a falling off of no less than 48,000, or a-third of the imports compared with those in May 1871. The total number of sheep and lambs we received up to the end of May was 337,435, and up to the same period of last year, 287,932. In the month the numbers were 76,486, to set against 124,515 in the corresponding month of last year.

There is no sale for swine in the London

is said, now-a-days. The trade led to country towns, such as Rom. The statistics of the Trade and Accounts would seem to bear out years in Copenhagen Fields. In which has just passed the pigs we numbered only 203, about a-forty of the lot landed in the same last year, when we imported 9678. For period we only imported 2018, 24,739.

It item that we come to in the curves to explain, to a considerable deficiency in the imports of swine. we received in the month no less 18 cwt., to contrast with 49,551 1871, and in the course of the we imported 1,082,031 cwt., as 5,772 cwt., thus shewing that and it more profitable to cure pigs pose of them in their bristles.

For beef we obtained in less quantity, the month and five months; but for salted beef came in smaller during the month, we had a large ex-longer periods.

There were in much greater demand, the month and five months, than been for years. 82,944 cwt. we had up to the end of May; in the 1 of 1871 only 26,097 cwt., or third. The demand goes on rearing, the receipts in the month le that of last May.

For class of "unenumerated meat," fresh, we find material increase in period for which the Returns are at in the shorter a falling off; and remark applies to preserved meat. Try to observe that even a moment should be noticeable in the e of commerce and consumption, to us that by the encourage-is kind of food, which is whole-palatable, a reduction might be the price of home-grown cattle. dited (not hams), there is an in-the month, but a falling off in onths, and fresh pork is very discount in both periods. Poultry

we obtained in greater supply in both periods. Eggs were more in demand, both in the month and in the five months—569,606 great hundreds having been imported during May; and from the beginning of the year up to the end of last month the imports reached 2,297,459. These figures shew more strongly than words the field there is open for the rearing of poultry at home.

Now just let us sum up this *little* bill for animal food that we are due to the foreigner for the first five months of the present year. For live stock the sum disbursed was £1,411,851. Bacon cost us £2,202,621; for beef, salted or fresh, or slightly salted, £249,927 was expended; for hams we paid £217,699; for "unenumerated meat," £409,178; for pork, £316,427; eggs cost us £899,713—giving a total of five million and three-quarters sterling.

Coming to bread-stuffs we find that we imported wheat in slightly diminished quantity during the month, but in the five months, our debit was larger. Barley and oats we received in larger quantities, alike in the month and five months. Indian corn or maize was in greater demand in both periods—greater even than in 1870. The amount of money expended upon these commodities, wheat-meal or flour included, was upwards of fourteen and a half millions sterling.

The following table shews the quantities, the countries whence they were derived, and the values, as compared with the five months of last year.

| Wheat. | QUANTITIES. | |
|--|---|---|
| | Five Months ended May 31, 1871. Cwt. | Five Months ended May 31, 1872. Cwt. |
| Russia..... | 5,371,551 | 7,094,137 |
| Denmark | 12,675 | 60,753 |
| Germany | 1,067,225 | 1,236,152 |
| France | 38,246 | 82,794 |
| Austrian Territories ... | 131,557 | 3,062 |
| Turkey, Wallachia, } and Moldavia | 429,925 | 376,385 |
| Egypt | 2,631 | 935,921 |
| United States | 4,719,200 | 2,441,205 |
| Chili | 88,990 | 477,004 |
| British North America | 348,739 | 80,209 |
| Other Countries | 88,968 | 289,772 |
| Total..... | 12,299,707 | 13,077,394 |

| | VALUE. | |
|--|------------|------------|
| Russia..... | £3,057,337 | £4,069,904 |
| Denmark | 8,320 | 39,175 |
| Germany | 706,009 | 828,487 |
| France | 21,248 | 48,202 |
| Austrian Territories ... | 83,679 | 2,094 |
| Turkey, Wallachia, } and Moldavia | 237,622 | 199,237 |
| Egypt..... | 1,425 | 472,593 |
| United States | 2,821,017 | 1,556,311 |
| Chili | 57,747 | 317,598 |
| British North America | 200,623 | 52,155 |
| Other Countries | 54,062 | 190,123 |
| Total | £7,249,089 | £7,775,879 |

Bones were in larger supply than in the month of May last year, and, on the longer period for which the Returns have been made up, there is an appreciable difference.

The imports of guano grow small by degrees, and beautifully less. The adjective could not have been applicably used in former times, when guano was good, but now there have been so many bad samples sent out, that we do not think farmers will care much if Peruvian is expunged from the list of manures. In the month we had only a-fourth of the quantity which we imported in the corresponding month of last year, and that shewed a declension in quantity of more than a-half on its predecessor. The total we received in the five months was 33,836 tons, to compare with 114,540 tons last year, and the cost, £315,652, as against £1,311,059. For nitrate of soda we expended £611,869, £100,000 more than we did in the five months of 1871.

Potatoes we imported in much larger quantities; flax, linseed, and rapeseed the same. Dairy produce did not, we are glad to say, come so plentifully as last year. We hope the short supplies indicate that we are paying greater attention to butter and cheese at home. Our expenditure, however, for food is still too large considering the suitability of our climate for the production of these articles, being for butter no less in the five months than £2,417,533, and for cheese £437,515.

With a very large falling off in the price of hops, we have had to pay foreign growers a great deal more for them, in fact double the price that we did last year.

There is a wonderful increase in the price of wool from over seas, principally due to the prolificness of Australia. The following tables shew the quantities and values of wool received during the five months of 1871, and the five months ended May 31, 1871.

| | QUANTITIES. | |
|-----------------------------|---------------------------------|---------------------------------|
| | Five Months ended May 31, 1871. | Five Months ended May 31, 1870. |
| Wool, Sheep, and Lambs. lb. | | |
| From Countries in Europe | 10,606,438 | 14,000,000 |
| „ British Possessions | | |
| in South Africa ... | 14,697,652 | 15,000,000 |
| „ British India | 9,955,578 | 9,000,000 |
| „ Australia | 1,090,948,811 | 120,000,000 |
| „ Other Countries..... | 10,537,708 | 15,000,000 |
| Total..... | 154,892,187 | 174,000,000 |

| | VALUE. | |
|--------------------------|------------|-------------|
| From Countries in Europe | £524,305 | £1,000,000 |
| „ British Possessions | | |
| in South Africa ... | 763,539 | 1,000,000 |
| „ British India | 336,876 | 1,000,000 |
| „ Australia | 6,330,383 | 7,000,000 |
| „ Other Countries..... | 366,461 | 1,000,000 |
| Total | £8,321,564 | £10,000,000 |

Turning to the other side of the account, we note that we have exported less of wool and cheese this year than last, a general fact, as it shews we are beginning to appreciate our own manufacture.

The number of horses have fallen off in the month and the five months of 1871. In France we only sent this year 553 tons to compare with 3164 last, but “other countries” not more specifically designated, took 8 more than in the corresponding time of 1871. The total number of horses sent out of the country up to the end of May 1871, was 1449, and the amount received for them £79,981, upwards of £55 a-head.

The exports of wool during the five months were much smaller than in the like period of last year, but in the longer period largely

TIPTREE HALL FARM.

By Mr J. J. MECHI.

IN order to remove agitation, excitement, and divergence of opinion as regards the history of this farm, I will simply state the facts, and leave your readers to draw their own conclusions. The farm, when I bought it, was known as Sadler's Farm, because a very worthy farmer of that name had occupied it originally for many years. Its name in the deeds was "Bignore's Farm." It was never called a hall until I so named it, after rebuilding the whole of the premises on a new site.

My original purchase was 128 acres and some poles, for £3150, or a fraction under £24 per acre. I bought it in 1841 of a respectable land agent, who once farmed it himself, and it was considered a reasonable price. The tenant then in possession paid £150 per annum rent for it. The great and small tithes were commuted (fortunately just before I made my improvements) at 5s. per acre. The farm-house was an antient white-washed lath-and-plaster building; the bed rooms were in the roof, lofty in the centre, and coming down at the eaves to about 18 inches, as near as I can remember. The old thatched farm buildings were detached from each other, and the north-east or any other wind had free passage between them. In fact, it was just such a piece of antiquity as one too frequently sees in this and other counties. The land was undrained, the fields and open ditch numerous, and of various and irregular shapes, as are at this moment most of the fields in Essex.

There was a bog (unsafe for man or beast) called the Wabbings, and a winding road down from Potter Row Lane to the premises, having a great hedge and ditch on each side with trees. By-the-by, I paid £100 for the timber on the farm. There were sundry odd pieces of waste, which I enclosed. I removed altogether about $3\frac{1}{2}$ miles of fences, and

filled in ditches, and have now 60 acres in one enclosure, and 42 in another, without a tree, but I have a shrubbery of some 2 acres for the birds to breed in. I have no doubt that in favourable seasons respectable crops were grown on the area available for cereals, but a wet season must have been disastrous, for when I first visited the farm in September 1842, on a wet day, with my old friend Dean (now hearty at eighty-seven), the light land was swampy, and the heavy as loving as birdlime, but as slippery as butter. The men assured me that some of the wheat crops that year yielded only about $1\frac{1}{2}$ to 2 qr. per acre; and, judging by the weak stubble and paucity of stacks, I can easily believe it. Now, owing to my deep drainage, the light land is always dry and workable, and the bog especially so, and I send down to my neighbours for many miles about 40 to 50 gallons of pure water each minute—summer and winter—more in the latter. The late medical man of the district used, jocularly, to say that I had spoiled all his best cases of fever down that line of brook. Any one who will take the trouble to inquire of some of the old men on our heath about the comparative condition and yield of this farm now and formerly will soon arrive at a satisfactory conclusion.

Finding the old buildings too tender for substantial repair, and otherwise unsuitable, I cleared the lot away—a very easy task—and erected a new house and homestead on higher ground, for when I first visited the farm I noticed a heap of peas growing from damp in what had been the best room. In fact the bailiff there lost his wife and several children from fever in a short space of time. In our new buildings health for man and beast for thirty years has been the order of the day. Some land adjoining, which I subsequently purchased, was enclosed from the heath about ninety years ago.

Now comes the great fox question. Foxes often come into this neighbourhood, and one Saturday afternoon, some years ago, a brace of them killed seventeen turkeys on an adjoining farm while the farmer was at market, and buried many of them in the dung-heaps, which were unspreed on the fields. A few years ago, a hard run vixen fox ran into a drain near my gate. It was a very cold day (Tiptree nipper), so I invited the hunters (about thirty) to refresh themselves, and they speedily cleared out all mine and my bailiff's bread and cheese, but the sherry held out. This led to my fixing a day for a general meet here and a champagne breakfast, when 150 red coats made their appearance on a bright day, and had good sport. A pretty sight it was, and I hope the manly sport of fox-hunting will never leave us. When the said thirty drank my health, and gave the 'view halloo! the hounds, finding the hall door ajar, rushed into the drawing-room, to the dismay of the hunters, who feared their dashing through the plate-glass windows, but I tranquilized them by my assurance that plate-glass, if stout, is dog-proof.

I can readily believe that Mr Smythies father (who by-the-by was one of the best judges of cattle in England) did make the remark, "that Tiptree Heath was too poor to hold the scent of a fox," for despite all that unfriendly critics may say or desire to the contrary, it has always had a bad name, and is spoken of contemptuously as poor cold Tiptree Heath, and sometimes "Tiptree Heath, God help you!" Its natural growth is of furze, broom, and ferns, which come spontaneously where I happen to leave a spot uncultivated, and furze fences thrive luxuriously. Still there is no doubt that the land, like most other common land, is improvable, as proved by my crops,* and only

* On one of these fields I grew, in 1868, 8 qr. of white wheat per acre, and realized from the corn and straw £28 per acre, or £4 more than I paid for the fee-simple; and in 1869 the same field yielded 7½ qr. of Rivett wheat. In 1870, 39 tons of mangold; and in 1871, 5 qr. of red wheat per acre; and it has now a promising growing crop of beans, to be followed by wheat. Other fields have often yielded 7 qr. of wheat per acre.

requires drainage, deeper cultivation, plenty of good manure, made by fine stock.

The moral I draw from my farm-tions is that example, good or bad, has a time, its influence. Thirty years ago pronounced to be somebody not very good, but now I can compliment many of my neighbours upon having adopted the very plan once condemned. It is really gratifying almost surprising to see what a change come over the scene in this immediate neighbourhood. Huge fences, green lanes &c., departed; land drained, clean, cultivation, roads improved, new cottages and buildings. Even Mr Mechi's 15 feet gant 25s. iron sheep-hurdles (in wear eight-years) are now "the order of the day" one firm in Colchester selling one hundred weekly.

I was the first who introduced here "that 'ere Huano" (guano), as some natives called it, and who did not believe that a mere "peppering" could do the land any good—nothing like muck." Well, it is a pleasant thing, a pleasant thing, to meet one's neighbours smiling faces, and a tacit admission that has done some good; but the labourers know what agricultural improvement and what it has done for them and their families, express to me, and, I know a deep sentiment of gratitude for the change that has taken place in their condition this neighbourhood within the last few years.

It is natural that there should be some jealousy and dislike on the part of the old farmers who do not believe in modern changes, but I am affectionately to "the good old times." I should, however, try to reconcile ourselves to this steam age, for the old kettle has upset and deranged many comfortable old prejudice or attachments made many people angry; but millicent received, and will continue to receive comforts and advantages. It is not to please everybody, and I never expect to do so.

The people of England want more

and other consumables; and as the land is neither half farmed nor half ed, by landowner or by tenant, there will be great changes and improvement.

Observation and experience have me, especially in this neighbourhood, a grand remedy for this uncomfortable

state of things is frequent change of ownership, by which means new sentiments and new and additional capital will, as a necessary result, flow into agricultural improvement. Therefore, I am most decidedly opposed to fixity of tenure by the laws of entail and primogeniture.

*FINGER-AND-TOE IN TURNIPS.**

THE cultivation and value of the turnip crop is increasing in this country, and disease of finger-and-toe is rapidly extending and destroying the bulbs to such an extent on many farms, that they are hardly raising, and unless checked it will be a great loss to every farm in the country. Any information on the cause, prevention, or cure of this disease must therefore be of great importance to landlords and tenants. It is regrettable that so little attention is given to this subject by any agricultural society in the country, and certainly no premium has been offered even to the extent of half-a-crown's worth of a bronze medal for any treatise on this subject.

Some writers maintain that an insect is the cause, like wireworm in wheat, and segg in turnips. I have frequently searched, with the microscope, the diseased plants in their earliest stages, but have failed to detect either an insect or such effects as an insect would produce.

No doubt, in the later stages, when the bulb is rotten, many insects will be found, but in the early stage, where decayed animal or vegetable matter exists.

It does not appear to be a fungus or parasitic smut or rust in wheat, blackball in barley, or a plant of the nature of mildew, called mildew, that destroys the roots of turnips, or a similar plant that produces the potato and bean disease, and the rot in potato tubers, or wood.

My opinion is, from the manner it acts in the turnip plant, that it is of the nature of a poison, either of animal or vegetable origin. I find this poison may be contained either in the soil, manure, turnip plants, or seed. In confirmation of this theory, I have abundance of facts, and will now shew, as briefly as possible, that it may be conveyed to any field by using diseased soil, manure, bulbs, or seed. I will then give such conclusions or suggestions for prevention or remedy as direct experiment on many farms entitles me to do.

In evidence that the poison may be in the soil, and from it communicated to the plant, irrespective of the manure or seed, I made a large series of experiments in deep, old, dry infield, formed from puddingstone rock, on the farm of Findon, in the parish of Gamrie, with various manures, applied separately, and also mixed, as farm-yard manure, partly formed from diseased turnips, bone dust, bones, and sulphuric acid, guano, &c. The field was carefully selected, equal in depth, exposure, &c., and I had two plots of $\frac{1}{8}$ th of an acre for each experiment. The result was that every turnip in the field was diseased upon the land that had no manure as well as what was manured. So great was the destruction of the crop, that 20 tons of farm-yard manure only added 3 tons of turnips, and 6 cwt. of finest Peruvian guano 6 tons more than what was sown without any manure.

That it is conveyed to the land by manure formed by cattle that had diseased turnips

Mr Alexander Murray, Nethermill, Cruden, Aberdeenshire.

given to them, I have seen hundreds of instances to shew. The strongest proof was in a field of turnips in a farm on the estate of Troup. The tenant improved some heather muir, dry, hard, chaddy soil, that had never been cultivated before. After one or two grain crops he sowed turnips in it; half of the field was manured with farm-yard manure formed from diseased turnips given to the cattle, and the other half manured with bone-dust and guano. The same seed was sown and at the same time. The turnips raised after the farm-yard dung were all diseased, and those after bones and guano were all sound.

James Bruce, Esq. of Longside, applied the scrapings of his turnip sheds, where diseased turnips were used, to top-dress some thin parts of a grass park. Subsequently, when that field was in turnips, those places that were top-dressed had the bulbs diseased, and in the rest of the field they were sound. I have seen instances where the turnips were only very partially diseased after poisoned manure, especially in red clay land, but it is the exception, and may be accounted for in several ways.

I find also that seed raised from diseased turnips contains the poison, and hence, where it is sown, it will develop itself. Nay, more, let sound turnips be planted in diseased soil, and the seed will be more or less smitten.

In proof of the seed conveying the disease, of many instances I have observed, one case was on the farm of Bridgend, in the parish of Cruden—Mr Snell, tenant. He got a few lbs. of a highly recommended variety of Swedes, when put into one of the boxes of the turnip-sowing barrow, and put sound seed of his own raising in the other box, so that every alternate two drills of turnips were of each variety of turnip. Those raised from his own seed were all sound bulbs, but the turnips from the new seed were all much diseased.

Some varieties of turnips are less liable to be smitten with finger-and-toe than others. Swedes are not smitten to the same extent as yellow turnips. Some soil is more or less

able to resist the poison than others, as red clay land suffers little, and light gravelly or damp haugh or moss land is very subject to it.

I have observed many causes that tend to induce the disease to destroy the crop, as cold wet spring while sowing the turnips, too rapidly preparing and sowing the land.

For the last thirty years I have directed my attention to this disease, over a large extent of the country, while engaged valuing land and as a Government inspector of drains, &c., with a view of finding a remedy, and I have succeeded to a certain extent. The application of lime I have not verified, but I have good evidence of its efficiency in some reported instances in the south of Scotland, and it is worthy of experiment where lime will not injure the grain crop.

The plan that I find succeeds best on various farms, is to turn up and expose the soil to the frost, drought, and sunshine. The usual plan of opening the drills, manuring, covering up the drills, and sowing them immediately, if done in diseased land, is the surest plan to destroy the turnips. Whereas, if the land be drilled for two or three weeks before the manuring and sowing, they may be sound turnips. Of course, if the weather be wet, the opening of the drills for a time will not do so much good, as weathering and exposing the soil appears to be necessary.

In proof of this theory, I saw a field of turnips where half of the land had the drills left open for two or three weeks previous to being manured and sown. The first half of the field had the drills opened, manured, and sown at once. Upon this part the turnips were all diseased; but in the former part they were nearly all sound. The same manure and seed were used. I observed a field in this farm where the plan of opening the drills for three weeks was adopted with success, for three years. The head and end rigs had the turnips very much rotten, but the rest of the field had the turnips, with very few exceptions, sound.

Again, I was engaged on a farm on the estate of Boyndlie, in the parish of Tyrie, of poor muir soil, where finger-and-toe used to prevail. I noticed that the farmer had all

his stubble land ploughed and roughly cross ploughed in the autumn, before he began to plough the lea. I asked him the reason. "Oh," he said, "I used to have all my turnips rotten with finger-and-toe, but ever since I have furrowed my stubble land, and turned in well up to the frost, which I have done for four years, I have always got clear of the disease."

This confirms my theory of exposing the land to the weather, and may account for some farms said to derive benefit by taking a second crop of oats or potatoes before sowing turnips. In proof of quickly opening and sowing the land with turnips, who has not observed, where the disease existed in the field, that the head and end rigs were always most affected? Farmers should be most careful in selecting turnip seed, and be certain that it is raised from sound turnips, and if possible from highly manured red clay land, which improves the quality of all kinds of turnips.

From what I have stated, and many years experimenting with the disease, I may be allowed to make the following suggestions and conclusions as to finger-and-toe in turnips:—I am of opinion that a number of experiments should be repeated on a large scale by a Commission appointed by the Highland and Agricultural Society of Scotland, in various parts of the country and in different seasons. It is a national question, materially affecting a large industry, involving large capital, which would be ruined if the disease became general; and this is the tendency to which the propagation of the disease by the affected manure, seed, and diseased plants clearly points, particularly as the soil once affected keeps up the disease in subsequent years.

The poison *reproduces* and *multiplies*, therefore it is not *mineral*. It is *vital*—one of the lower *vitalities*—whether *animal* or *vegetable* is of no consequence.

Its history, that is, its mode of propagation, what favours or retards, or prevents its development, are the essential points. My experiments prove:—

1. That it may exist in the decreased

plants, and be subsequently developed where the plant grows.

2. That it exists in the diseased roots, and continues in the soil where they grow, and it also exists in the dung of cattle that have eaten the diseased roots.

3. That the disease appears equally from the seed of diseased plants in all sorts and under all kinds of manures.

4. That the disease will appear in land where the disease formerly existed after all kinds of manure, with the possible exception of lands to which lime has been applied. Experiments are wanting to shew for how many years the land retains this power of reproducing the disease; this is important, in so far as if it only lasted for a few years, intermediate crops of potatoes, &c., might be sown.

5. Diseased land which has been recently ploughed and sown appears to produce the disease more readily than when ploughed and exposed to the action of frost, sun, and air. This will not influence the crop from diseased seed or manure from cattle that have been fed on diseased roots. This is an important practical remedy, and experiments should be made to illustrate it.

6. Experiments should be made by steeping seed from diseased plants in various chemical solutions, and then sowing it in sound ground, such as arsenic, carbolic acid, sulphuric acid, sulphate of iron, &c. If any of these prevented the disease appearing in the turnips, it might be applied to diseased land, if not too expensive; but seed from diseased turnips should never be used on the farm.

7. Experiments should be made of spreading out and exposing to the frost and sun the dung of cattle using diseased turnips. It is possible the frost may kill the poison.

8. Experiments should be made of adding different chemicals, as in No. 6, along with the sound seed sown in diseased land.

From my experience of ascertaining the results of upwards of 200 experiments with manures, crops, &c., not less than $\frac{1}{8}$ th of an acre should be used for each experiment. This extent may be considered large by some

people; but even after the most careful selection of say 1-160th part of an acre, and $\frac{1}{16}$ th of an acre of turnips, I frequently had from 2 to 3 tons of difference of weight per acre. I have verified this result so often,

that I put no value on results of crops taken from 1-160th part of an acre, more especially if taken in one drill of turnips. Duplicate experiments are also specially valuable to agriculturists.

SUGAR-BEET CULTIVATION IN ENGLAND.

WE import annually, says Mr James Caird, in a letter to the *Times*, about 2,000,000 tons of wheat and 700,000 tons of sugar. Our foreign supply of these two great articles of consumption is thus in the proportion of nearly three to one. Adding the home supply of wheat, and converting the whole into flour, the annual consumption per head is something over four of flour to one of sugar. Next to bread, sugar has thus become a main necessary of life in this country, and contributes immensely to the comfort of the poorer classes, and especially during times of low wages and irregular employment.

The Lancashire grocers will tell you that at such periods the consumption of sugar and tea by the labouring class largely increases, for then they cannot so well afford the greater luxuries of beef and beer, for which in prosperous times like the present there is so great a demand and so large a consumption. High wages have become synonymous with a high price of butcher's meat, low wages with a rapid increase in the demand for sugar. There is now no tax left the abolition of which would be so generally and immediately felt among the poorest class of the people as the duty on sugar.

The supply is not equal to the demand, and yet every effort is being made, both in the tropics and on the Continent, to increase the production of cane and beet sugar; but the price continues to rise, and nothing, therefore, can be more encouraging than the prospects of the sugar grower. Notwithstanding this, only one vigorous attempt to introduce the cultivation of sugar has yet been made in England.

The fourth season at Lavenham, in Suffolk, closed in February last. The growth of sugar-beet has each year increased, beginning in 1868 with 1000 tons, rising to 3400 tons in 1869, 4500 in 1870, 6200 in 1871, and the promise of a growth for the present season of 8000 to 10,000 tons. The crops have varied with the seasons, both in quantity and quality; but these figures shew very plainly that the farmers of Lavenham have found it to suit their business to grow sugar-beet at the price of 20s. per ton; and the manufacturer, Mr Duncan, on the average of these years, is equally satisfied with the result to him. During the four months of the manufacture about £500 a-month was spent in wages, nearly the whole of which was a clear addition to the ordinary wages' fund of the locality in the winter season.

The past season proved unfavourable for the manufacture all over Europe. The yield of sugar was small, as is proved by the fact that, notwithstanding a large increase of acreage under sugar-beet, the Continental sugar crop of 1871 is estimated to have produced only 860,000 tons, as compared with 942,000 tons in 1870 on a considerably smaller area. The same influence of season operated unfavourably in England. It paid the grower, because the crop was bulky; but the manufacturer had a smaller per-centage of sugar. These vicissitudes of season must be expected, and Mr Duncan has satisfied himself, by personal examination on the Continent, that the deficiency of saccharine yield in France and Germany was at least as great as he had found it in Suffolk. This has not checked the progress of beet culture. New

are springing up in France, Germany and Austria. In Belgium alone new factories are now being erected, and in Holland nine.

It is an agricultural industry that has made most rapid strides on the Continent, and has brought great and general benefit wherever it has been introduced. It necessitates and requires a higher and more enriching system of manuring, and is uniformly attended by a great increase in the production of fat cattle and a higher yield of corn. The climate and soil of the North and South Midland counties of England, and as it is a method which unites the advantages of live stock and corn with the most rapid and larger returns of the manufacturer, would hail it as a welcome addition to the present agricultural system. One great difficulty

in modern English agriculture, where high farming is practised, is to get beyond a certain high average produce of corn. That difficulty has been solved in some of the northern counties by the more extensive growth of potatoes. The culture of beet would be more suitable to the southern and eastern counties, and more enriching, as the pulp is returned to the farm to be consumed by fattening cattle, and it might prove an agreeable change both to the farmer and the soil from the uniform routine of the four-course system. If sugar should come to be regarded as a prime necessary of food, which, like bread, should be untaxed, we might see a very rapid development of sugar culture in England, with advantages to consumer and producer even greater than have everywhere followed its introduction into Continental countries.

BET-SUGAR CULTIVATION IN THE UNITED STATES.

An interesting report on the cultivation of sugar-beets has been issued by Mr Charles A. Goessman, Ph.D., of Massachusetts Agricultural College. In an experiment was made on the farm with 47 acres of land, prepared in the best manner possible for the reception of seed. Owing to the want of a suitable drill for sowing the seed, the rows were 1½ feet apart, instead of from 18 to 24 inches apart, as should have been the case, thus leaving considerable waste land. The hand drill also worked imperfectly, leaving blank spaces in some of the rows. Under these unfavourable circumstances, the crop averaged 22,200 lb. to the acre. The seeds of the following varieties of beets were sown, namely:—Vilmorin of 1869, ditto of 1869, Electoral of 1869, Vienna Globe of 1869, varieties of 1870. The Imperial sugar-beet seed of 1870—gave 12.59 per cent. sugar; Vilmorin, 12.95 per cent. ;

Electoral, 12.30 per cent. ; Vienna, red, white, and yellow globe beets, 8.004 per cent. ; ordinary mangolds, 5.035. These results were obtained by analysis, and not in the regular process of manufacture. A computation, made with these results as a basis, shews a handsome margin of clear profit obtainable on the assumption that the extracting process would be economically and skilfully conducted. In concluding his report, Professor Goessman touches upon a vital point relative to the profitable extension of the beet-sugar manufacture in the United States. It has been argued, against the introduction of this manufacture, that the difference in the price of the American and European labour forbids the hope of our competing with foreign producers. This argument is met by Professor Goessman, thus:—

“Although recognizing the great weight of this point—for with the farmer rests the success of the enterprise in the end—I believe

that its influence as an obstacle is frequently overrated, and based on somewhat obsolete assumptions. The Government tax of from 40 dols. to 50 dols. per acre of sugar-beets, in Germany and France, as well as our higher prices of sugar, will go far towards covering our most expensive labour. The interests of the Louisiana sugar planters and the sugar-beet cultivators of more northern sections of the country are the same, as far as a proper protection of their industry is concerned; and the public opinion, in view of the requirements of the Government, is apparently prepared to accord to them, for some time at least, this advantage. Great improvements in agricultural implements and in modes of securing the juice have reduce labour by hand to a considerable extent. A short enumeration of the most conspicuous instances may place this statement in its proper light. Various seeding machines, improvements more or less on Garrett's famous seed drill, are used in planting the seed, in four or more rows at once, and at any desired distances from 12 to 20 inches apart. According to the size of the machine, one or two men, with one or two horses or oxen, may seed from 8 to 16 acres per day; the same implement can also be modified by replacing the seed boxes with suitable knives to be used as cultivators, to clean the space between the rows of plants, and to cover the roots. Ploughs with two knives are used to break up the soil

on both sides of the rows of beets, to the latter in such a manner, without rating them, that children may do the vesting of the roots. In fact, the whole in the field, after the soil is once properly broken up, calls for no extraordinary labour. A good deal of the work can be done by Machines do the washing, the grinding, cutting, and general handling of the pulp to the centrifugal apparatus. The handling the pulp of beetroots for the requires, comparatively speaking, a large number of hands to do the business connected with that process, but Roberts' dispensing with a large number of the formerly required in the press-room—one-half."

In further support of his position the author cites the introduction of the Rotary diffusion process, which, though it reduces the expenses for labour in the press one-half, yet this reduction only made up the sixth of the extra earnings of the manufacturer. It is thus seen to what an extent the success of this industry depends upon the successful culture of the roots; and though successful culture is undoubtedly requisite in all the subsequent processes of extraction and manufacture of the sugar, it appears plain that, with increasing knowledge, we shall be able ultimately to establish this department of agriculture on a more sound and permanent basis.

THE IMPROVEMENT OF PASTURE LAND IN WALES.

By MR BUCKLEY.*

THE subject we have for consideration is the improvement of our "Existing Grass Lands," that is, of our pastures and meadows. Do not the high prices of butchers' meat and of dairy produce increasingly press these subjects upon our attention? I noticed a few weeks ago that to relieve the high price

of animal food an honourable member of the House of Commons proposed to lay a restriction on the killing of calves and lambs. It appears to me that if such a measure could be enforced, it would be more likely to decrease than increase the quantity of butcher's meat. It is not the increase of the number of animals, but, first of all, the increase of animal food, by extending and improving our

* Read before the Carmarthenshire Farmers' Club.

that will effect so great and desirable
ect. Very many of our farmers already
more stock than they can well support.
we take into consideration the steady
e of the population of the United King-
t the rate of a-quarter of a million an-
and the flourishing state of trade,
ictures, and commerce, enabling our
s and workmen to pay for meat,
rise still higher in price, and that
not be well even for the farmer.
t not these considerations, seeing that
farming a part of the kingdom where
mate and soil are naturally and pecu-
adapted to the growth of grass, and
dly inferior for the production of corn,
us to give our best attention to the
ing and improving our pastures and
ws? But so far from this being the
do not most of our farmers devote
chief attention to their arable land,
g it to their farm-yard dung, and arti-
manures for the wheat and root crops,
again followed by corn, which on this
n coast should only be grown as an
ite crop, while their grass lands receive
else than an occasional application of
ad earth? I would just here remark,
sing, that if on an average one-third
f our land was arable and cultivated
four-course, or any other alternate
we should be able to produce more
etter corn than we do at the present

THE DRAINAGE OF PASTURE LAND.

er, as to the improvement of our existing
ands. I need hardly say that if the
wet, the first step is efficient draining,
le or no improvement can be effected
t it. Draining being a very expensive
on, it should not be commenced until
ad has been well examined and the
of its wetness thoroughly investigated ;
re are cases in which a considerable
may be made dry by, perhaps, a
drain, and so save a considerable out-
The wetness may arise from a spring
ier land that rarely gives an indication
position on the surface, and if that
VOL. IX.

spring can be tapped by cutting a drain into
it, the water may be led away to the outfall
by a single drain. Such springs usually shew
themselves after long continued rain or the
breaking up of a heavy frost, and by, at such
times, marking the place or places where the
water breaks out, may afterwards be cut down
into. In one instance, I have by a single
drain dried the side of a hill, and led the
water a considerable distance down to a pond
near the farm-yard for the benefit of the ducks
and geese ; and in another (where a consider-
able surface was wetted) to a place where I
can divert it from going to the outfall, to irri-
gate about 3 acres of pasture. It is, I am
satisfied, of no use to attempt the draining
of pure bog or peat land without cutting
through the peat down 1 foot at least into
the clay or sandy clay always found under-
neath, and which forms an impervious basin,
by the existence of which the bog has been
formed. If the peat is not more than 5
or 6 feet thick in the deepest places, and
an outfall can be found, and if the quality
of the peat is such as to have a tolerably
good turf on the surface, it may pay well
for draining. As an experiment, I drained
about 5 acres of such peat, which I should
state, had been attempted to be drained some
years before with pipes laid in the peat,
which proved a failure, most of the drains
having filled up. The drains I had cut 4
feet deep, and went 1 foot or more into
the sandy clay, except in a few places
where I had to go deeper. Over the pipes
which were placed at the bottom of the drains,
1 foot of well-broken stones was filled in, and
on the top of the stones was placed the sur-
face sod reversed to keep out the peat soil
with which the drains were filled up. I then
gave the field a dressing of lime mixed with
the sandy clay left from the drains, and bush-
harrowed in such grass seeds as I considered
suitable to the soil. These drains were cut
in parallel lines down the slope of the field,
and the quantity of water carried off is very
large. This draining was done in the winter,
and the following summer (which was last
summer), I found the grass seeds coming a
good plant, and appeared likely to establish

themselves. I should say that on all soils after draining, a dressing of lime, or, still better, of lime and earth, is the most suitable application, as there will invariably be more or less inert vegetable matter to be brought into action; and as the sour aquatic herbage will die out, having lost its congenial element, that a sowing of suitable grass seeds should be at the same time bush-harrowed into the surface. I would never plough or break the surface of any grass land, either newly-drained or naturally dry, although foul with rushes, docks, or other trash, if it could be reclaimed without it; for the close sward of turf (proof against the tread of cattle that if ploughed would poach it) will require years to be renewed, and the temptation to take several crops of corn may end in exhaustion, and its not returning to permanent grass at all. But if the unevenness of the surface or strength of the rushes, gorse, or other trash, render it advisable to plough, I would not on any consideration pare and burn the surface turf, but having with a bill-hook or other tool cleared the growth or trash which may be burnt, would, with a strong wrought-iron plough and sufficient power, turn over the land, make the summer fallow to kill the roots of weeds, and the following winter and spring work it to a fine even surface. The soil, by this process, will have become a turfy loam full of organic matter—just such as the gardeners so much prize for making compost. In this I would sow the suitable perennial grass seed without taking a corn crop; but if a corn crop must be had, it should be sown very thin.

IMPROVING BOTH STOCK AND PASTURE.

I will now assume that the grass lands are dry from having been drained or not requiring it. They vary much, of course, in quality and value, according to soil, aspect, altitude, and other circumstances. I do not bring into account the vast breadth of high precipitate mountain land that is not improvable and is only fit for sheep-walks. Now, I will first speak of that large proportion of our grazing lands upon which are reared and fed all those two and three year old steers and

heifers that crowd our fairs and are sold and driven in innumerable herds out of the country. These grass lands, we will say, are of medium quality, though they vary, of course, considerably. Now, let us consider the improvement of this extensive class of our pastures. I do not think that they are at all improved or raised in quality by the continuous grazing of these young cattle, or by sheep, without any other assistance, but rather otherwise—that is, that they are in some measure deteriorated by the exhaustion of the phosphates and other elements abstracted to supply the bone and muscle of these growing animals. Now, if instead of all these two and coming three years old being sold and driven out of the country, a proportion of the freshest of them were kept and turned on some of the best of these medium pastures, and their grazing assisted with a little corn and oilcake—beginning with a little at first, and increasing the quantity gradually as they improved in condition, so as to bring them out fit for the butcher in July, August, and September (just the time to command a good price)—would not these pastures, by this process, be raised in fertility, and gradually become, in time, even capable of fattening without such assistance, or, as a change, would they not afford rich grazing for the dairy cows? And, at the same time, would not the young cattle fed off pay for their corn and cake? I have no doubt but that they would, and leave a profit besides. I quite believe that much of our grazing land may be greatly improved by such process. Turnips and other roots are sometimes carted and scattered over these pastures as an assistance in supporting sheep and cattle, and will be of some advantage; but lands grazed without anything returned to them will require the elements abstracted renewed in them; and as farm-yard dung cannot be spared for this class of grass lands, they may be supplied by superphosphate or ground bones (which will be more slow but more lasting in effect). Professor Voelcker instituted during five or six years, a number of field experiments on permanent pastures, which he published in the *Journal*

The Royal Agricultural Society in 1869. He observes that the condition under ammonia, lime, and phosphates act specially upon vegetation, are far better stood than those under which nitrates, or of potash, may be applied to the land advantage. And he states that he had on these experiments with the view according to the practical farmer the art of judging for himself when he might advantage employ nitrate of soda or manures. The results of these experiments invariably went to shew that the transition to permanent pastures from each of the most named, applied separately, was so easy as not to encourage their use. Of all manures he experimented with, a mixture, one half of Peruvian guano and mineral phosphate gave by far the greatest results. In the last number of the *Journal* of the Royal Agricultural Society just published, there is a very able article on the management of grass lands, from the pen of Mr H. Thompson of York; and if the combination of similar substances used by him would produce the same wonderful results in general use, he states that it is applicable to both heavy (light land), it will prove an important discovery, although a rather expensive manure. It appears that Professor Voelcker now recommends nearly the same combination. One cwt. nitrate of soda, 2 cwt. mineral phosphate, and 3 cwt. of kainit per acre, cost being about 42s. There can be no doubt as to the excellence of this manure as an application to grass lands. I should, however, like to try alongside of it the mixture of Peruvian guano and mineral superphosphate, one half, 4 cwt. of which would come to the same cost, less money, or as I think better still substitute pure dissolved bones for the mineral superphosphate. A dressing of lime earth at intervals of six or eight years is found very beneficial on most pastures, especially if at the same time a sprinkling of clover seed is bush-harrowed in, such as clover, alsike, cocksfoot, that is, *Trifolium glomerata*, perennial ryegrass, meadow fescue, perennial cowgrass, and trefoil,

MOWING MEADOW FOR HAY : ARABLE AND GRASS LAND.

A nice pasture upon which I wintered several two-year-old colts, the winter before last, was so cut up by their galloping and racing about that it looked almost as if ploughed, and I feared it was injured for years; I however took the opportunity of bush-harrowing in a sprinkling of suitable grass seed and rolling, and it now presents an appearance of rich herbage, among which I identify those sown quite superior to what it was before. I need scarcely say, that where irrigation can be availed of it should not be neglected, and in this country of springs and uneven surface, water may often be turned on and off the surface by a little contrivance. Meadows that are mown for hay should, if they are to maintain their productiveness, have a coat of good farm-yard dung for every crop taken from them, which for this and most other purposes is the best of all manures. Lime or lime and earth may be usefully substituted every sixth or eighth year. It is not an uncommon usage to mow a crop of hay every other year, and to graze the intervening year, without returning anything or but little to the land. This is a good deal the case where the grass is let for the season or year. It is a sure means of deterioration, and will shew itself soonest on light soils. The bright green spots of grass here and there over the field, where the dung or urine of the cattle has dropped, tell plainly enough what manure is wanted. Even our very best and richest grass lands require attention, not only to keep them clean from docks, thistles, nettles, and other weeds, but to renovate and fertilize according to the draft upon them. If not mown for hay, they may require a dressing of bones, or such manures as I just now named. We have some grass lands, which, with the same attention bestowed upon them, would be perhaps equal to any in the kingdom. Would they were more extensive! They are to be found on the alluvial lands here and there skirting our coast, and at the bottoms of our beauti-

ul valleys; and some of the slopes rising on their sides are not much inferior. Some of the hilly lands, particularly on the Silurian formation, are clothed with grass of superior quality; and on the mountain limestone the herbage, though rather short, is so sweet as to support large and productive dairies. In conclusion, if what I endeavoured to sketch out could be realized, by the larger and best adapted portion of the arable lands of these western counties becoming productive pasture and meadow, varying on the different farms according to the nature of the soils, and reserving such a portion for tillage as would be required for the management of the farm in the production of roots, corn, straw, and clover, in rotation; the result must be more numerous and improved herds and flocks, more productive dairies, and a much greater part of the animals reared being sold off fat. I say herds and flocks improved in size, form, and quality; for although breed

does not go in at the mouth, as it is sometimes said, no improvement can be effected or maintained without corresponding improved feelings, protection, and attention, which in effect means the improved cultivation of our grass lands. The stock reared on the farm will always be of the same character as the farm and the farming. I have seen a herd of our native black cattle on a well-managed farm, that for beautiful symmetry and uniformity throughout, it was a pleasure to look at. And I have also seen on a poor, badly managed farm the same native blacks almost as small and meagre as Shetland cattle. Now that a special interest has at length been raised, for which I believe we are mainly indebted to Mr Bowen, of Llwyllogwair, it would be interesting, and no doubt exceedingly useful, if a treatise or essay on the origin, history, and improvement of our native cattle could be procured from a pen qualified for the task.

DISEASES IN TURNIPS.

WE publish an article, page 27, on that insidious disease—Finger-and-toe in turnips, from the pen of Mr Murray, Nethermills, in the county of Aberdeen. Mr Murray, having long taken a deep interest in this matter, ought to be well acquainted with the literature of the subject. It is with astonishment, therefore, we see him writing that “it is remarkable that so little attention is given to this subject by any agricultural society in Scotland, and certainly no premium has been offered, even to the extent of half-a-crown’s worth of a bronze medal, for any treatise on the subject.” So far from this being the case, up to the end of 1865, no fewer than eight articles on Finger-and-toe had appeared in the *Transactions* of the Highland and Agricultural Society. As long ago as 1852, that Society submitted a series of queries to the principal farmers of Scotland, with a view of eliciting all the information that it was possible to obtain on

the matter, and at the same time gave instructions to Professors Anderson and Balfour to report thereon.

The results of the collective information obtained, and from the reports of the learned professors, were briefly and concisely summed up at a meeting of the Banff and Turriff Agricultural Association, more than ten years ago. They were these:—

1. That the variety of turnips most liable to suffer from this disease is white globes, but that no variety is altogether exempt.
2. That it prevails most extensively on light gravelly soils, while there is almost no instance of it on heavy clays.
3. That the treading of land by cartage, or otherwise, especially when wet, increases its virulence.
4. That the mode of manuring and the variety of manure employed, has no influence either to increase or diminish the evil.
5. That no precise time can be fixed as that at which it makes its appearance, although it is generally seen after the turnips are thinned.
6. That the frequent repetition of turnips on the

same land does not invariably produce disease, as many cases are reported where it prevails to an alarming extent on lands where turnips had never been grown before.

7. That the storing of turnips during winter in a stubble field intended for turnips the following year, and also the application of turnips, either as sound or diseased to a turnip crop, invariably produces the disease.

8. That it is not due to any chemical change in the soil.

9. That it is not dependent on any chemical change in the plant itself, but that the changes observed are the consequences of diseased action.

10. That insects are invariably present during the earlier stages, and that to their action the disease is to be mainly attributable.

Now, these statements and results ought to convince Mr Murray that this important subject has not only, as he says, received *little*, but that during the last twenty years it has received a *great deal* of attention. Nine years ago Mr Murray himself discussed it at the Buchan Club, holding then a similar poisonous theory to that which he does in the communication we publish to-day.

Eleven years ago THE FARMER published a communication on the subject from one of the most acute observers of the day, the late Rev. James Duncan. His ideas

were, not that it was a disease originating like that of the potato, during the progress of cultivation, or in consequence of the influences of cultivation; for, said he, "we observe an affection in wild plants of the same natural order, as nearly like it as the different conditions of growth can be supposed to admit of. In the other cruciferous plants similarly affected, the malady can be traced to the operation of insects; and this of itself affords a strong presumption that it proceeds from the same cause in the turnip. Indeed, of all the views that have been advanced, the insect theory is the most probable, and it may be regarded as nearly demonstrated as such cases admit of." But with that sagacity which characterized Mr Duncan, he added, "even if it were not admitted that the fly in question is the entire or originating cause of the disease, it is still most desirable that its increase should be prevented, for no one will deny that it hastens rapidly the decay and putrefaction of the bulb." We agree with Mr Duncan that finger-and-toe results from insect injury, although we do not quite hold, as he did, that strong plants are as liable to insect attacks as sickly ones. Mr Murray's paper is, however, well worthy of perusal.

BREEDING OF AGRICULTURAL HORSES.

By Mr T. LONGWOOD.*

THERE are certain laws which govern the principles of breeding which, when followed up and persevered in, raise the standard of animals so bred. A disregard of those laws lowers the grade in a like degree however pure bred the originals that were commenced with. Now, if I advocated nothing but the purchase of long-priced, good brood mares as a start in breeding, tenant-farmers with stiff heavy land to work would, I know, send forth their objections thick and quick, it being a much more

hazardous undertaking to breed colts on heavy than on light land; still, that course pursued, matching the mares with equally worthy sires, effects not only a saving in years, but establishes a fixed type far more certain to produce good things, than commencing with inferior mares, however carefully and judiciously breeders may continue to pair the sexes. If I look the facts in the face, I find that the plan generally adopted is to obtain the services of one stallion for the several mares had in contemplation for breeding. Now that apparent cut-short, toss-penny move won't bear inspection. Food consumed

* Read before the Stowmarket Farmers' Club.

in the rearing of ordinary foals had far better be expended in rearing neat stock, and, as a farmer must have horses, buy yearling colts, which in their turn shall fill up coming gaps in the stables.

MATCHING BREEDING ANIMALS.

By way of illustration, I will suppose six mares diverse in make; the 1st, a long, low, wide-spread mare; No. 2, a short-made, leggy, mare; No. 3, a fair-proportioned, long, light-legged one; No. 4, a short, punchy one; No. 5, a long mare, with fine hind-quarters, but narrow-chested; No. 6, a stylish one, with substance, good form and size. Now it is a fact that, however good in points and general contour a horse may be, not one can be found suited to such a lot; but I have taken extreme cases for example sake. No. 1, a long, low, wide mare, is so constructed that Nature has furnished her with a capacity and powers for the development of a large offspring. An over-sized horse in comparison to her—and should he be a trifle leggy—would cross well with her, provided defective points in her were met with good points in him. No. 2, a short-made, leggy mare, is just the sort, with a crested neck so often spoken of, as a good mare to breed by. Observant eyes will have noticed in a flock how frequently a long, low-made ewe produces large twins. When the ewe, formed in the trunk like this mare, has but a puny lamb, it is so with mares where there is no length of back or ends—there is no room for the growth of the foetus. Thus disappointment ensues. There is danger also from the projecting sides, a lengthy mare carrying her young closer and safer. No. 3, a long light-made mare needs a punchy horse with long back ribs, for if short the progeny will be too high and long—a regular ail as we sometimes hear. A colt, as a two-year-old, should have length, and if let down at the flank, grows downwards into a valuable horse. No. 4, a small punchy sort, is the stamp which many suppose requires a high slashing horse, but such crossing proves almost always a failure, the reason of which is this, the deposit of the male is too much for the

fructifying powers of the female to carry out No. 5, a lengthy big mare, with fair hind-quarters but narrow-chested. I had often wondered that mares of this stamp paired with an undersized stallion should throw a colt with a full, open chest. Cline's excellent paper on form asserts why:—"To obtain animals with large lungs, crossing is the most expeditious method; putting well-formed females from a variety of a large size to a male of a variety which is smaller. By such crossings the lungs and heart become proportionately larger, in consequence of a peculiarity in the circulation of the foetus, which causes a larger portion of the blood under such circumstances to be distributed to the lungs than to the other parts of the body and as the shape and size of the chest depend upon that of the lungs, hence arises the remarkably large chest which is produced by crossing by females that are larger than the males." In No. 6, a stylish, compact, weighty mare, with size, he would know how to remedy defects by giving her a horse good in his points where she was weak; but his favourite mare frequently gets her generative organs damaged by becoming too fat; a mare in fair condition being more healthy and likely to stint.

SELECTING SIRE AND DAM.

I have mentioned an over-sized and an under-sized horse in comparison to the mare. As an index, I should say for the horse to stand on a par with the mare he should stand three quarters of a hand higher, proportioned accordingly. The more sorty a lot of mares are, the less occasion there is to use a variety of stallions. It is the lack of distinctness of character in a stable that calls for sorting. To shew to what length the late Mr. Blenheim went in selection, I find in his sale of the Middle Park yearling blood colts in June, where 40 were sold for £15,000, less than 15 blood sires were employed. In his case it was strains of blood which influenced him in a great measure. Seek to avoid hereditary diseases in the parents, viz. blindness, broken wind, spavins, curbs, ring bones, sidebones, grease, farcy, &c. I would

also warn you, discard a mare which approaches being hatchet-headed, pig-necked, roach-backed, or goose-rumped, cat-hammed, very cross-ankled, or pigeon-toed; such shapes being too far gone to ever hope to remedy the glaring defects which doubtless have been produced by something worse than careless breeding. One thing amongst others which has urged me to recite the foregoing examples, has been to shew the principles adopted to grow big things, as the breeder's aim ought to be to meet the requirements of the day; for with double-furrow ploughs fast coming into use, horse-engines requiring speed, good-sized horses for town work requiring size, not at the expense of activity, compactness, and quality, ought to be kept in view. I would further add, that in pairing a lengthy mare with an under-sized but compact horse in comparison to her, in the produce will be seen, in the one crossing, the lengthy proportions of bone combined with the stoutness of the other; but to enlarge the size, not losing sight of compactness—in starting with a short mare, it will take something like three crossings of gradually lengthened sires to bring that about. The male distinctly influences the form of the offspring in draught-horses, but the higher in the equine race the more the mare seems to reverse that order. This accounts for the Arab valuing far more highly the breeding form of the dam than he does the sire for stud purposes.

PREPOTENCY OF THE MALE.

In selecting a stallion for a mare, the breeder's first start should be to become familiar with her defects in conformation, and also her good points, and then working up to a given model, had in view, seek to overcome defects by extra good points in the horse, but avoid extremes, or you will be foiled; rather take two crossings than too long a stride at once. Where the breeder gets into the fix of having two stallions of similar type, give the preference to the one whose pedigree stands the higher. I will acknowledge that what I call a jump in the dark may be taken, thus, either a difficulty in

arriving at a knowledge of the parent's descent, or a false one may be given, and so damage the breeder's best constructed plans. Surely here it is that a stud-book would be of some service in tracing strains, and not only so, but it would be a tribute of respect justly due to the painstaking individuals who have carefully cultivated the better families brought down to our time. That the colour of the male in animals predominates in the offspring there can be little doubt; but with the Suffolk horse, in which some five different tinges of the chestnut colour prevail, viz., dark chestnut, dark red, bright chestnut, silver-beamed, and light chestnut, it need not be wondered at that a horse having various tinges in his escutcheon should occasionally throw a paler or darker shade than himself in colour, that tending to a dark should indicate hardihood, the pale or light chestnut fostering grease.

IMPROVING THE BREED OF CART-HORSES.

In selecting suitable sires shirk not a little trouble, be not turned aside from so doing by the present saving of a sovereign or so, or because the horse's owner happens to be the first or thirty-second cousin to you. I am persuaded that real help in improving our horses would arise from an established spring show of stallions. One of the rules of the Dishley Society forbade any member from shewing rams only to members of that society on certain fixed days, before shewing the rams to non-members. The beneficial result of this was (for it was like playing the cards into one's own hands) that the most useful rams were reserved for the society's special use. Fortunately for us the stallion owner cares not to reserve the exclusive right to the horse's services, although in the show field this often militates against him. As a very successful breeder and exhibitor put it, it was a comparatively easy thing to take first honours, but to maintain that position was not so easy, descendants of his own horses coming out to battle against him. I said established, I should have said re-established spring shows, for I find in an old county chronicle, bearing the date of 1790, a report of Woodbridge April show of entire horses,

and Mr James Reed, of Laxfield, tells me that fifty years ago he remembered Mr Julian—who was a Catlin in his day—shewing for horses at the same place in that day's fashionable but unsightly style, being long-tailed. Thanks to some Woodbridge people, who have the place and the will, we look again like having a show established.

POINTS IN BREEDING AND REARING.

The obesity of the horse is often objected to, the objectors stating as their ground for it, that it damages their procreative powers. There is a vast deal depending on a horse-dealer's judgment and experience. It is the overloading a colt with fat which does the mischief, for just as the overtaxed two-year-olds on the turf fly in their legs, and beget an impaired stock when used in the stud, so overdone colts from early service go at the hocks, and frequently reproduce in their stock the bad effects; but two-year-olds being less used of late, hocks certainly look cleaner. Two and three-year-olds are nothing like so sure as older horses for service. The month of May has always been spoken of by old heads as the season for the mare going on kindly. The change then to green food may be an assistance, but more regulated atmosphere does very much too. At the time of covering, and a few days after, it is well not to

have the mare over-heated. When discovered slipping her foal, where in-foal mares are, have her off at or sick house—sympathy in ewes is bad that way, in mares it is worse. The of good working soil has an advantage the heavy land farmer in breeding, it is that on the latter we are kept sometimes weeks, off the land by Then, when the mare next goes plough—she may have been kept work—the heavy work so tells upon a loss of the embryo takes place. Common practice of putting two-year-olds tends to dwarf and pull out of shape once promising colt. From these is, we find, that a large majority of inhibitors in the agricultural horse our shows are light-land men. That helps to forward colts nicely is to foal, when quite young, a bait or two crushed oats and bran—away from that, as the young one ages, they be worked more frequently. This is helpful at weaning time, as hardly a milk fat takes place. A penny of condiment given daily through the feed sends the colt on well. My difficulty taking the condiment off without loss of condition. I manage that by giving a few peas at the time of turning out to graze.

THE BEST MANURES FOR POTATOES.

By Mr YOOL, Coulard Bank.*

I SHALL not attempt to answer definitely the question as to the most suitable manure for the successful cultivation of the potato in the county, but will lay before you the results of some experiments carried out by me last season, which I consider to be amongst the most successful I have ever carried out, and which shew fewer anomalies than most agricultural experiments. The

experiments were instituted in place for the purpose of ascertaining the necessity, or otherwise, of potash salts to the potato crop when arranging them for this purpose. I solved to carry them somewhat further the view of determining the action of monia and superphosphate of lime in mixture, as well as in farm-yard manure upon the crop. The soil on which the experiments were carried out consists

* Read before the Morayshire Farmers' Club.

very equal in quality, as the soil will shew, and was only in moderate agricultural condition, consisting of light sandy loam—very suitable for growing good potatoes. The field had been undered in 1869, and wheat in 1870. The experimental plots consisted of an acre. The drills were 27 inches, and the potatoes (Regents) were sown at intervals of 10 inches in the drills. Plots were planted on 1st May 1871. Plots were dunged and manured exactly as the rest of the field. I may say, at, in the following tabulated list I have calculated all the different manures on the imperial acre, to avoid multiples and confusion. The plots as used on them were arranged as

—16 loads dung, 2 cwt. sulphate of ammonia, 3 cwt. dissolved coprolites, and 2 cwt. kainit, per acre.

16 loads dung per acre.

No manure.

2 cwt. sulphate of ammonia, 4 cwt. dissolved coprolites, 2 cwt. kainit, per acre.

4 cwt. sulphate of ammonia, 4 cwt. dissolved coprolites, per acre.

4 cwt. dissolved coprolites, and 2 cwt. kainit, per acre.

No manure.

—4 cwt. sulphate of ammonia, 2 cwt. kainit, per acre.

—2 cwt. sulphate of ammonia, 4 cwt. dissolved coprolites, per acre.

—4 cwt. sulphate of ammonia per acre.

—No manure.

—4 cwt. dissolved coprolites per acre.

—4 cwt. kainit per acre.

—No manure.

—16 loads dung per acre.

—16 loads dung, 2 cwt. sulphate of ammonia, 3 cwt. dissolved coprolites, and 2 cwt. kainit, per acre.

EARLY APPEARANCE OF THE CROPS.

The sulphate of ammonia contained 24 per cent. ammonia; the dissolved coprolites 26 per cent. soluble, and 5 per cent. insoluble phosphates; and the potash salts 24 per cent. sulphate of potash. The manures were sown in the drills, the potatoes planted, and the drills split in the usual way. The after cultivation consisted of hand and horse hoeing, and, finally, earthing up; and the plots were lifted, and weighed on the 2d November. Before proceeding to state the final results, I may give you the notes made upon the different plots on the 16th June, when in a growing state:—No. 1 well up and looking fresh. No. 2 not nearly so far advanced as No. 1, but rather further advanced than the nothing plots. No. 3 of the same colour as No. 2, and nearly as far forward; darker than No. 1, but not nearly so far advanced or growthy looking. No. 4 further advanced, and of a rather paler green than No. 1. No. 5, robust looking, dark green stems, and nearly as far forward as No. 4. No. 6 pale green stems, and not so robust or forward as Nos. 4 and 5. No. 7 same as No. 3. No. 8 slightly farther advanced than No. 7, and darkish green stems. No. 9 fully further advanced, but of much the same colour and appearance as No. 4—these plots, viz., 4 and 9, being much the furthest forward of the lot, and followed by No. 5. No. 10 about the same state of forwardness as No. 6, but of a dark green colour. No. 11 not such robust or dark green stems, but nearly as forward as 10. No. 12 further forward than 11, but lighter coloured. No. 13 of a darker green, but otherwise much the same appearance as No. 12, though scarcely so forward, about the same for forwardness as the nothing plots. No. 14 much like 13. No. 15, like 2. No. 16, like 1. On the 12th July the plots were again carefully gone over, and the following notes made—On east end of the plots, where the soil is rather lighter, No. 9 looked as well as No. 4 or No. 5; but on the stronger land, towards the west end of the plot, No. 5 looked best; then No. 4, followed by No. 9. On the whole, No. 5 looked best,

then 4, and then 9. There was not very much difference in the appearance of the other plots, that is to say, the nothing plots and the remainder of those dressed with artificials alone. On the 5th August, they were again carefully looked at, and the note made that the plots having most sulphate of ammonia were looking best.

THE RESULTS OF THE EXPERIMENTS.

The different plots were lifted and weighed on 2d November. They were dressed over $1\frac{5}{8}$ inch riddle, the large ones [and the small separately weighed, and pitted. No diseased tubers were taken out at this time. They were left in the pits until the 15th March last, when they were dressed over, the diseased ones thrown out, and the sound ones weighed. This was done for the purpose of ascertaining which of the manures tended most to increase the spread of disease. As already stated, although the plots were only $\frac{1}{16}$ th of an acre each, the following results are all calculated to the imperial acre:—

| No. | | Large. | | | | Small. | | | | Total. | | | |
|-----|-----|--------|----|----|----|--------|----|----|----|--------|----|----|----|
| | | T. | C. | Q. | L. | T. | C. | Q. | L. | T. | C. | Q. | L. |
| 1. | ... | 7 | 4 | 3 | 12 | 2 | 1 | 0 | 8 | 9 | 5 | 3 | 20 |
| 2. | ... | 5 | 5 | 3 | 12 | 1 | 5 | 2 | 24 | 6 | 11 | 2 | 8 |
| 3. | ... | 3 | 18 | 1 | 12 | 1 | 2 | 1 | 12 | 5 | 0 | 2 | 24 |
| 4. | ... | 7 | 15 | 1 | 12 | 2 | 4 | 2 | 24 | 10 | 0 | 0 | 8 |
| 5. | ... | 9 | 19 | 0 | 8 | 2 | 4 | 1 | 4 | 12 | 3 | 1 | 12 |
| 6. | ... | 4 | 18 | 0 | 8 | 1 | 8 | 2 | 8 | 6 | 6 | 2 | 16 |
| 7. | ... | 3 | 19 | 2 | 24 | 1 | 4 | 3 | 4 | 5 | 4 | 2 | 0 |
| 8. | ... | 6 | 6 | 2 | 24 | 1 | 11 | 1 | 20 | 7 | 18 | 0 | 16 |
| 9. | ... | 7 | 7 | 2 | 8 | 2 | 1 | 2 | 8 | 9 | 9 | 0 | 16 |
| 10. | ... | 7 | 2 | 2 | 0 | 1 | 16 | 1 | 4 | 8 | 18 | 3 | 4 |
| 11. | ... | 3 | 15 | 0 | 0 | 1 | 8 | 3 | 20 | 5 | 3 | 3 | 20 |
| 12. | ... | 3 | 16 | 1 | 4 | 1 | 10 | 1 | 12 | 5 | 6 | 2 | 16 |
| 13. | ... | 4 | 0 | 1 | 12 | 1 | 5 | 2 | 0 | 5 | 5 | 3 | 12 |
| 14. | ... | 4 | 0 | 3 | 4 | 1 | 3 | 3 | 12 | 5 | 4 | 2 | 16 |
| 15. | ... | 5 | 6 | 2 | 16 | 1 | 7 | 3 | 4 | 6 | 14 | 1 | 20 |
| 16. | ... | 7 | 9 | 1 | 4 | 1 | 16 | 3 | 12 | 9 | 6 | 0 | 16 |

THE INFLUENCE OF ARTIFICIAL MANURE.

The first point to which I would wish to call your attention in regard to these experiments is the quality of the ground, as indicated by the returns from the plots which got no manure, as well as by plots 1 and 16 and plots 2 and 15, which were respectively manured alike. The average of the four nothing plots is 5 tons 3 cwt. 1 qr. 22 lb. per acre: while the lowest of these plots only

differs 2 cwt. 2 qr. and 26 lb. from the average, and the lowest plot is only 3 cwt. 20 lb. less than the highest of them. You will observe that the difference between plots 1 and 16, situated at opposite ends of the experiment ground, and which were manured alike, is very slight. The same mark applies to plots 2 and 15, which were also manured alike. All this shews that the ground was of remarkably uniform quality, and so far, most suitable for such experiments. I will now ask you to consider some of the most important points brought out by these experiments. In the first place, the influence of sulphate of ammonia is very marked, either alone, or in combination with the other manures. In every case it has caused a very considerable increase in the yield of crop. Even when, as in plot 1, sulphate of ammonia alone was used, the crop reached 9 tons 18 cwt. 3 qr. 4 lb. per acre, being 8 tons 15 cwt. 1 qr. 10 lb. above the nothing plots. Again, in plot 2, 2 cwt. of sulphate of ammonia was used in conjunction with 4 cwt. dissolved coprolites; the results obtained were still more favourable, viz., 9 tons 9 cwt. and 16 lb., being 7 tons 11 cwt. 2 qr. 22 lb. above the average of the nothing plots which got no manure. Plot 3, where the same manure was used as in plot 2, with the addition of 2 cwt. potash, gave the very large return of 6 tons 19 cwt. 18 lb., being 6 tons 19 cwt. 18 lb. above the nothing plots. Potash alone and dissolved coprolites alone gave a very trifling increase over the nothing plots. Kainit in combination with sulphate of ammonia, as in plot 8, gave a less return, viz., 7 tons 18 lb. per acre than sulphate of ammonia alone. This result is doubtless due to such a large dose of saline manure being applied to the roots of the plant. In this case, only half the quantity been mixed with the other manures previously, and the other half applied in drill, the results would in all probability have been somewhat different. The ac-

4 cwt. dissolved coprolites to sulphate of ammonia, as in plot 5, gave an increase of 3 tons 4 cwt. 2 qr. 8 lb. per acre above sulphate of ammonia alone, and an increase of 6 tons 19 cwt. 3 qr. 18 lb. above the nothing plots. Superphosphate and kainit, as in plot 6, gave an increase of 1 ton 3 cwt. 22 lb. above the nothing plots. Sixteen loads dung per acre gave, taking the average of the two plots, Nos. 2 and 15, 6 tons 13 cwt. potatoes, being 1 ton 9 cwt. 2 qr. 6 lb. more than the nothing plots; while the addition of 2 cwt. sulphate of ammonia, 3 cwt. superphosphate, and 2 cwt. of kainit per acre gave, taking the average of plots 1 and 16, 9 tons 6 cwt. 4 lb. per acre, being an increase over the dung alone of 2 tons 13 cwt. 4 lb., and over the plots without manure, of 4 tons 2 cwt. 2 qr. 10 lb. per acre. Plot 4, however, without dung, and with very nearly the same quantities and kinds of artificial manures as plots 1 and 16, gave a larger return than they did, while plot 5 gave by far the largest return of any. The influence of artificial manures, and especially of sulphate of ammonia, and superphosphate of lime in conjunction, on the potato crop on the field under notice, was very marked; while potash salts, on the whole, were only of slight benefit.

THE MIXTURE AND APPLICATION OF MANURES.

On the 13th March last, the different plots were again dressed over, the diseased and decayed tubers thrown out, and the sound ones weighed. About one-third of the tubers were found to be more or less diseased, the proportion of diseased being somewhat larger in the plots which got dung than in those which got artificial manure alone, but the difference between any of the plots in this respect was not very striking. The experiments, as a whole, have, in my opinion, been very successful, and present fewer anomalies than agricultural experiments often do, and I hope that the details which I have now had the pleasure of laying before you may prove of some value as a guide to practice on soils similar to that on which the experiments were carried out. I would, how-

ever, caution those who grow potatoes on the lighter class of soils, which are so common in this county, against using such a large quantity of ammoniacal manure as that which produced the greatest results in the experiments which I have laid before you, because, from experiments which I have noticed carried out on light land, and from my own observation and experience, I am of opinion that on the light soils of this county the action of ammoniacal manures will be less marked, and that of superphosphate and potash salts more marked than in the heavier classes of soil; and that, therefore, as the land gets lighter, the proportion of ammoniacal manure should be reduced, and that of superphosphates, bones, and potash salts increased.

I have thus endeavoured to direct your attention to the principles which should be a guide to us in forming mixtures of the artificial manures for the potato crop. When once these principles are understood, what the farmer has to do is to purchase the necessary materials at the cheapest rate, and mix them for himself. The same material can be got in different forms. For instance, you can get nitrogen, the valuable element in ammonia, in guano, in sulphate of ammonia, in nitrate of soda, &c., but the relative prices of these articles vary from year to year, and sometimes you can buy the desirable nitrogen cheaper in one form than the other. The same holds true with regard to superphosphate of lime, potash salts, and other manurial substances. From this you will see that "the most suitable manure for the successful cultivation of the potato crop, having regard to the quantity and cost per acre," may vary from year to year, in accordance with the fluctuating prices of the different substances from which the desirable manurial elements are derived; and it is only by knowing the principles which should be followed in forming the most suitable mixtures for the different kinds of soils that the farmer can enter the manure market to the greatest advantage, and purchase the different articles which he requires in the cheapest and most suitable terms.

THE HEDGEROWISM OF THE UNITED KINGDOM

By J. J. MECHI.

HOW many miles of hedgerows are there in the United Kingdom? What is the average width of the banks on which they stand? How many yards on each side of the bank do the robber roots extend? And how many hundred thousand miles of unnecessary wide ditches are there? How many trees per acre are there in our 46,000,000 of acres? Here we want Mr Fonblanque, and he certainly could readily obtain for us some of the measurements and quantities. I am led to make these remarks by a conversation I had the other day with a particularly intelligent gentleman, not a hundred miles from Exeter, who has greatly improved his land. As we were walking over my fields, or rather field (for my farm is nearly all field), I said, "How large are your fields?" "Well," he replied, "I have greatly enlarged them. In one case I threw six fields into one." I said, "How large is it now?" To my great astonishment he replied, "6 acres!" Perceiving my surprise, "Oh!" he said, "there is a parish not far from mine where there are 170 miles of hedgerows!" So I thought how many parishes has Devonshire. Essex has 420, and Suffolk many more. Devonshire is much larger than either. I said once, at the late Sir Robert Peel's, that I thought we could safely spare 500,000 miles of fences, with their accompanying pollards, but I am afraid I took very much too limited an estimate of our national hedgerowism. Imagine a nation like ours, wanting in one-third of its daily bread (which it obtains from foreigners), devoting an immense area of its precious soil to the growth of bushes or almost worthless timber. Before we worked our coal mines or had imported wood (London had no coals some three centuries ago), the growth of timber was a national necessity, but the pastoral and

wooden ages are fast fading away forced out economically by the get the produce of our coal mines—I said our gold mines—for we raise 1 tons a-year, and most of us know if not the value, of a ton of coal. everything was wooden, but now in iron and steam age, and everything iron, or economically should be so more than a century ago we had no railways, no steam-engines or steam therefore, even had we then discovered coal and iron, they were both inaccessible and unavailable. No fences, and all the farm should be of iron, from ploughs and to pails and pig troughs. Oh! Mr Mechi, you are ruining it by cutting down trees, and removing fences, thus diminishing rainfall and I at once admit that Spain and the Continental countries, with dry shining sun, have committed this fatal in these small islands of cloud and stiff cold wet clay wanting sun, and such risks, especially Devonshire wall, pushed into the broad Atlantic washed by the hot and moist C. As to shelter for live stock, we ally coming to artificial shelter, turning out system for our cattle and sheep. If we could calculate the amount of loss caused by small numerous headlands, by short crooked fields; by weed-product by the roots of trees extending below the ploughed land for some 50 yards, thus robbing the soil of fertility, the grand total of loss would and enlighten us. This subject worthy of consideration by landlords desire to increase their rentals.

The Garden.

SUGGESTIONS FOR THE IMPROVEMENT OF THE VERBENA.

LOOKING at the numerous and remarkably diversified varieties of Verbena which now adorn our plant houses and flower gardens, or at the still more numerous and formidable array of names which fill large sections of nursery sale catalogues, none who have not previously ascertained the fact could possibly conceive that scarce forty years have passed since the original representatives of this universally admired race of showiest summer flowers first received anything like general cultivation in British gardens; yet such is unquestionably the case. In 1826, Mr Poinsette collected seeds of several Verbenas in the neighbourhood of Buenos Ayres, which he transmitted to John Hawkins, Esq., of Bignor Park, Petworth, Sussex, where, under the management of his gardener, Mr John Perry, the first flowered in May 1827, and was figured (from a plant grown by Mr Harrison, gardener to the Earl of Egremont), in Sweet's "Botanical Register" of the following year, under the name of *V. Melindres*. This name was given to it by Lindley, in ignorance that it had been previously called *V. chamædrifolia* in Persoon's "Synopsis" by no less an authority than Jussieu, a circumstance which led to a little confusion, in consequence of its being known under both these names among cultivators. That such a brilliant-coloured and neat-habited plant should have been hailed as a most important acquisition, was nothing more than what might have been expected; and accordingly it became the popular flower of the day, and was eulogized as follows in Maund's "Botanic Garden" for February 1831:—"Its flowers are intensely brilliant, without glossiness, and yet it has a dazzling effect on the sight, not unlike the lustre of polished metal. The eye cannot rest upon it without evident uneasiness. If any artist or artizan, in the pride of his heart, assume to himself excess of merit for the tints he has discovered, let him look on this plant, and subdue the intemperate heat of his imagination." Such was the admiration bestowed upon *V. Melindres*, that Verbena culture at once became popular, and not only were old obsolete species resuscitated, but new ones were eagerly sought for, more especially in South America, which had become noted as the land of Verbenas. Of the former, *V. bonariensis*, introduced from Buenos Ayres so early as 1732, and *V. Aubletia*, from North America in 1774, again became common inhabitants of our gardens; and of the latter, *V. venosa*, brought home in 1830, *V. Tweediana*, as well as *V. Sabini*, in 1834, *V. incisa*, in 1836, and *V. teucroides*, in 1837, were received by cultivators into particular favour. Of these, *V. Tweediana* and *V. incisa* are so closely allied to *V. Melindres*, that notwithstanding their having been separated from it, and named by such an eminent authority as Hooker, the propriety of considering them as distinct species has been questioned. In the "Botanical Magazine" for December 1836, *V. Tweediana* is described as having much affinity with the last-named species, but differing from it in being of a much taller and more upright habit of growth, "clothed with soft downy hairs of a much more delicate texture, especially in the leaves, which are considerably larger, more acuminate and serrated, more cuneate at the base, and decidedly petioled. The flowers are larger and more inclining to rose colour ('rich rosy crimson'), in greater number, and the racemes more capitate." In the same magazine for January 1838, *V. incisa* is described as "another South

American Verbena of the Melindres group ; it is extremely handsome ; the blossoms are of a deep red rose colour, with a yellow eye, and become paler in age ; it differs from *V. Tweediana* in the broad and depressed (not spiked) corymbs ; and in the broader leaves, which are more deeply lobed, and cut in a pinnatifid manner." In Paxton's "Magazine of Botany" for December 1838, appeared a well-executed figure, along with the following description, of *V. teucroides* :—"The plant is erect, and grows about 2 feet high ; its flower spike is generally more than 6 inches long ; the flowers are of a delicate pinkish white, gradually deepening into rich rosy pink as they begin to decay ; and they are delightfully fragrant. It first flowered in the Glasnevin Botanic Garden in August 1838 ;" and Mr T. Handasyde, of Musselburgh, who purchased the whole stock, first sent it out in April 1839.

From these four reputed species, *V. Melindres*, *V. Tweediana*, *V. incisa*, and *V. teucroides*, have sprung almost all the most popular Verbenas now in cultivation ; and while it may be conceded that little room for further improving them seems now to exist, in the lines of advance which cultivators have hitherto chosen, yet there are others which would afford ample scope for the exercise of their skill ; among which we would specially particularize those of habit of growth and of fragrance.

In regard to habit, it is a remarkable fact that among all the now popular Verbenas none possess the dwarf spreading growth of the original *V. Melindres*, the departure from which first arose by crossing it and the *V. Tweediana*, and became consummated when that so-called "improved strain" became in its turn further incorporated with the still much more vigorous growing *V. teucroides*. To overcome this strong up-growing tendency in modern varieties, recourse is had to the tedious and (to render it effectual) continuous operation of pegging down, which, even when best performed, never gives that rose surfacing of foliage which the *V. Melindres* spreads around of its own accord.

As flower and not leaf improvement hitherto been the principal end aimed at by growers, it follows that some of the most perfect blossoming kinds are, in the earlier and latter parts of the season, little different in appearance from common Nettles ; and while this is the case in the warmer and drier districts of the country, it is more noticable in the upland and mountain parts. Hence some eminent horticulturists who are so situated, never attempt to grow the coarser leaved kinds, and even to depend largely on the *V. Melindres* and other low-growing sorts for their principal flower play. Dwarf compact growth is not, however, the only desirable habit for Verbenas, but a much taller habit than has yet been obtained is also desirable, provided it be acquired with good foliage and stout growth outline. The 6 feet high *V. bonariensis* possesses these desirable characteristics, but is only deficient in size of flower. This might, however, be overcome by hybridizing it with some of the large-flowered kinds, which might produce a new race of Verbenas far more elegant and effective than any yet seen.

Fragrance is a property which Verbenas have almost entirely ignored among all the varieties now in cultivation, and is doubtful if any will stand comparison in this respect with the old "delightful grant" *V. teucroides*, from which most of our whites and other strong-growing large-flowered kinds are descended. And what a new race would be obtained were a hybridal combination produced between that universal favourite the lemon-scented *V. triphylla*, and the large-flowered kinds ! In attempting the attainment of this highly-desirable result, we would caution hybridizers not to be deterred, because botanists have separated the lemon-scented from the Verbenas, and restored its original name of *Aloysia citriodora*. By art and skill they may be enabled to leap this fanciful barrier, as easily as we have already done more difficult observations in amalgamating other separated genera. Variegating the foliage and doubling the flower of Verbenas are other lines of im-

n which little or almost nothing has been done. By prosecuting the former most objectionable feature in the plants it only be overcome, but rendered really ornamental; and by the latter, long endurance in the flowers, that invariable accompaniment of *doubling*, will be obtained.—*W. G.*

HERBACEOUS AND ALPINE PLANTS.

[Continued from vol. viii., page 405]

HILLEA forms a numerous genera of herbaceous fibrous-rooted perennials, mostly natives of southern Europe, some of which are purely alpine, perfectly in this country, and worthy of a place in large collections. The following selection will meet the requirements of villa gardens:—

omentosa.—A lovely plant for the mixed border; leaves tomentose, very finely cut, stem-clasping petiole; flowers yellow, fine aromatic smell; continues a long beauty, and a plant which should be in every collection. It will grow in almost any soil or situation; height about 18 inches; in flower from May to August.

Millefolium.—The rose and variegated are very pretty varieties of the common Yarrow, which grows so plentifully on the roadsides in many parts of England. These are amongst the most elegant dwarf-growing native plants, the former with close broad-topped corymbs of a rose colour, instead of white, as in the common type; the latter is a variegated form common species. Both are admirably suited for rockery cultivation, but will also succeed themselves equally well in the border and in any ordinary garden. The variegated variety makes a fine plant for large beds.

umbellata is also a fine rock plant, and well suited for edgings, silvery-leaved, very dwarf.

Egyptiaca is also a fine rock plant, doing in a dry exposed situation, a fine contrast for variety, having very pretty foliage,

and pale yellow flowers; seldom exceeds 1 foot in height.

A. ptarmica, commonly known in this country as Sneezewort, from the dried powder of the leaves having a tendency to provoke sneezing; common in some parts of Britain by the sides of ditches, &c. A most useful plant for the sub-tropical garden, shrubby, or mixed border. The flowers are white, on stems reaching from 2½ to 3 feet high in good ground. This is the same plant which is known in some country places under the name of Bastard Pellitory. The roots, which have a bitterish aromatic taste, are sometimes used as a remedy for toothache. There is also a very fine double form of this species.

A. macrophylla, *A. Eupatorium*, and *A. filipendula*, will be useful species for the sub-tropical garden.

A. tanacetifolia, *A. aurea*, *A. ageratum*, and *A. Clavennæ*, will come in well for the mixed border. This latter species, I may say, is a fine rock plant.

All the species of *Achillea* may be propagated by division of the roots, either in spring or autumn. Many of them are readily increased by seeds, which should be sown in March, and transplanted as soon as strong enough to handle. These will flower the following summer. A strong loamy soil suits them best.

Acorus Calamus (the common Sweet Flag) is found growing wild in some parts of England, in wet marshy places and on river banks. It has long sword-shaped leaves, and a singular cylindrical spike of flowers, rendering it a valuable and a distinctive

feature in the sub-tropical garden. It grows well in moist garden soil, but I have never known an instance of its flowering out of its natural habitat. It usually attains a height of 3 feet, and blooms naturally from June to August. Both this and its variegated form are useful as affording a striking and distinctive character in the shrubbery. They have no equals for creating a natural and interesting effect on the margin of a lake. Both increase rapidly under favourable circumstances.

Arum maculatum (spotted Cuckoo-pint) is an interesting plant for the mixed border; the spikes of fruit, composed as they are of large red berries, are very ornamental in the autumn months. The root of this plant is said to be still used or manufactured into sago in the Island of Portland, and also for making starch, and called starch-wort; it is also commonly known as Priest's Pint, Wake Robin, Lords and Ladies, &c. It grows about 1 foot high.

A. italicum.—This plant grows about 18 inches high, with broad arrow-shaped leaves, of a fine shining green veined with white. The flower-spike is supported on stout erect stalks; fruit, scarlet, and very interesting in the autumn months; indigenous to southern Europe, but thoroughly acclimatized in this country, growing wild in localities in the south of England. They are very interesting plants, botanically, in many ways, but the great problem to solve—curiosity about the species—lies in the fact that the spadix about the time of opening emits a considerable heat, and what purpose this heat may serve is still a matter of conjecture.

A. Dracunculus (Long-sheathed, or Dragon Arum).—I should not have included this plant in this list, because of its very disagreeable scent, but I wish, as far as possible, to notice such of our common hardy plants as are best suited for sub-tropical effect in this country. Few plants are better suited for that sort of thing than this. The stalks are often above 3 feet high, and beautifully spotted, spreading out into dark green leaves at the top, palmate, or divided into several narrow segments; the flower is produced at the extremity of the stalk; spathe long,

erect, of a dark purple colour; the spathe large, and also purple, standing well; the foliage, giving the whole plant a tropical appearance. These plants propagate themselves very fast by off-sets from the base. The best time to transplant them is as soon as the seeds are ripe, as they begin to grow new fibres about October. They succeed well in any common garden soil.

Arundo Donax (Reed Grass).—The genus which I propose to include in this list may be safely classed amongst our ornamental collection of hardy perennials. Such kinds only can be named as are worthy of cultivation in the most select collections. They should be frequently used as decorative plants; many of them would make a grand addition to the garden and give a distinctive feature to the rockery; others, again, would make the finest possible groups for the sub-tropical garden, or, in connexion with other plants, form groups for the margins of lakes, &c. This species is one of the noblest Grasses known, and a grand subject for the sub-tropical garden, strong tufts growing to the height of 4 feet and upwards. Few plants could possibly create a finer effect than a strong clump of this, edged with its variegated variety. The common form will stand the winter well in this country, in ground moderately drained, and allowed to retain the protection of its foliage until March. The variegated sorts are more tender, but stands well in some situations; in others it must be protected in winter; it also makes a fine pot plant. It is a native of southern Europe, where the common sort is used for a variety of purposes, such as stakes for supporting Vines, &c. This species is of more recent introduction, and quite hardy; also a fine plant for the sub-tropical garden. In habit it somewhat resembles the Pampas Grass, but the leaves are broader; height about 3 feet. In the open ground the flowers are thrown up to a height of 4 or even 5 feet.

Aiopsis pulchella is a small and elegant Grass for the rockery.

Agrostis nebulosa is another gem which should be in all collections.—*Robert Bu*

[To be continued.]

ROTATION OF CROPS IN THE KITCHEN GARDEN.

is a subject, worthy the attention of the cultivator who aims at the largest production and the highest possible of every kind of kitchen garden crops. But we are bound to say, by the face, that rotation cropping is of more importance to the gardener than to the farmer, and for this good reason, that the farmer usually has a greater command of manure, and where liberal manuring is practised, rotation is of far less consequence. For manure is a scarce article, and is only applied in so scanty a manner that crops have to depend mainly for their development on the natural capabilities of the soil. But to both parties this is a subject of importance, and if differing in degree in respective cases, is alike in principle, determined by the natural relations of the plant and the soil as to their several constituents.

This principle may be illustrated by comparing the demands of two of the most important kitchen garden crops. If we submit a sample of the destructive agency of fire, and the ashes that remain, we shall find 21 per cent. of sulphuric acid, 12 per cent. of phosphoric acid, 20 per cent. of soda, 10 per cent. of potash, and 20 per cent. of lime. Evident that we cannot grow a Cabbage on a soil utterly destitute of these ingredients, nothing of others which occur in small quantities. The obnoxious odour of Cabbages admitted by decaying Cabbages might lead to any one accustomed to reflect on the occurrences, that this mineral is an important constituent of Cabbage. If we submit a Potato tuber to a similar process, the result will be to find in the ashes 55 per cent. of potash, 11 per cent. of soda, 13 per cent. of sulphuric acid, 12 per cent. of phosphoric acid, and 12 per cent. of lime. Now the lesson the cultivator is, that to prepare a soil for the raising of it is of the utmost importance to use a manure containing sulphates, phosphates,

and soda and potash salts in considerable quantity; as for the lime, that can be supplied separately, but the Cabbage must have it. On the other hand, to prepare a soil for Potatoes, it is of the utmost importance to employ a manure strongly charged with salts of potash and phosphates, but it need not be highly charged with soda or lime, for we find but little of these elements in the Potato. As in one case sulphur and soda may be said to predominate, so in the other we may say that potash predominates, while in both the phosphates are equal. Now there are soils so naturally rich in all that crops require, that they may be tilled for years without the aid of manures, and will not cease to present the cultivator with an abundant reward for all his pains. But these soils are exceptional, and those that constantly need manuring are the rule. One point more, ere we proceed to apply to practice these elementary considerations. In almost every soil, whether strong clay, mellow loam, poor sand, or even chalk, there are comminglings of all the minerals required by plants, and indeed if there were not, we should see no herbage on the downs, and no Elms, and Alders, and Ivies climbing as they do to the topmost heights of limestone rocks. But usually a considerable proportion of those mineral constituents on which plants feed, are, as it were, locked up in the staple, and are dissolved out slowly as the rain, the dew, the always moving air, and even the sunshine act upon them. As the rock slowly yields up its phosphates and alkalies and solutions of silica to the wild vegetation that runs riot upon it, so the cultivated field (which is but rock in a state of decay) yields up its phosphates and alkalies and solutions of silica for the service of plants quickly, because it is the practice of the cultivator to stir it about and continually expose fresh surfaces to the transforming power of the atmosphere. It has been said

that the air we breathe is a powerful manure. So it is, but not in the same sense that stable dung or guano is a powerful manure. The air may and does afford to plants much of their food, but it can only help them to the minerals they require by dissolving them out of pebbles, flints, nodules of chalk, sandstone, and other substances in the soil which contain them in what we may term a locked-up condition. The importance of frequent and deep stirrings of the soil is seen in this, that every fresh surface exposed to the air, and especially to frost and snow, is as the opening of a new mine of minerals for the service of those plants on which man depends for his subsistence.

The application to practice of these considerations is an extremely simple matter in the first instance, but it may become very complicated before we have done with it. Here, indeed, we can only touch the surface of the subject, yet we hope to do so usefully. Suppose that we grow Cabbage, or Cauliflower, or Brocoli, on the same plot of ground, one crop following the other as rapidly as possible for a long series of years, and take care never to refresh the soil with a scrap of manure. It must be evident that we shall, some day or other, find the crop fail through the exhaustion of the soil of its available sulphur, soda, phosphates, lime, and potash. But if this soil were allowed to lie fallow for some time, it would again produce a crop of Cabbage, owing to the liberation from the locked-up state of mineral matters which, when the crops were failing, were not liberated fast enough, but owing to the rest allowed the soil, have at last accumulated sufficiently to sustain a crop. Now the reader will perceive that this mode of procedure is unprofitable, to begin with, and tends of necessity to utter exhaustion of the soil, although we must confess that utter exhaustion of any soil is a thing at present unknown. However, instead of following an exhaustive practice, we enrich the soil with manure, and change the crops on the same plot, so that when one crop has largely taxed it for one class of minerals, another crop is put on which will tax it for another class of minerals. Let us

take for a moment's consideration one of the necessary constituents of a fertile soil, common salt. In the ash of a Cabbage there is about 5 or 6 per cent. of this mineral, in the Turnip about 10 per cent., in the Potato 2 to 3 per cent., in the Mangold or Beet 20 to 40 per cent. On the other hand, the Mangold or Beet is almost destitute of sulphur and phosphates, but they both agree in being strongly charged with potash and soda. Now, it follows that if we crop a piece of ground with Cabbage, and wish to avoid the failure that may occur if we continue to crop with Cabbage, we may expect to do well by giving the ground a dressing of common salt and alkalies, and then crop it with Beets or Mangolds.

The whole subject is not exhausted by this mode of viewing it, for, in the first place, the whole subject is not yet fully understood by the ablest of our chemists and physiologists, and, in the next place, crops differ in their modes of seeking nourishment, and we might find two distinct plants nearly agreeing in chemical constitution, and yet one might fail where the other would succeed. Suppose, for instance, we have grown Cabbage and other surface rooting crops until the soil begins to fail, even then we might obtain from it a good crop of Parsnips or Carrots, for the simple reason that these send their roots down to a stratum that the Cabbage never reached, and it is most instructive to bear in mind that although the Parsnip will grow well on poor land, and pay well on land that has been badly tilled for years, yet the ashes of the Parsnip contain 36 per cent. of potash, 11 per cent. of lime, 18 per cent. of phosphoric acid, 6 per cent. of sulphuric acid, 3 per cent. of phosphate of iron, and 5 per cent. of common salt. How does the Parsnip obtain its mineral food in an exhausted soil? Simply by pushing down for it into a mine that has been but little worked, though the Cabbage might fail on the same plot through trusting to the over-worked superficial stratum.

Having attempted a general, we now proceed to a particular application. In the first place, it is proper to say that good land,

well tilled and abundantly manured, cannot be soon exhausted; but even in this case a rotation of crops is advisable. It is less easy to say why, than to insist that in practice we find it so. The question then arises—What is a rotation of crops? It is the ordering of their succession in such a manner that they will successively tax the soil for mineral elements in a different manner. A good rotation will include both chemical and mechanical differences, and place tap-roots in a course between surface roots, as, for example, Carrots, Parsnips, and Beets, after Cabbage, Cauliflower, and Brocoli; and light, quick surface crops, such as Spinach, to serve as substitutes for fallows. The cropping of the kitchen garden should be, as far as possible, so ordered that plants of the same natural families never succeed one another; and, above all things, it is important to shift from place to place, from year to year, all the Cabbage-worts and the Potatoes, for these are the most exhaustive crops we grow. In 1 ton of Potatoes there are about 12 lb. of potash, 4 lb. of sulphuric acid, $2\frac{1}{2}$ lb. of phosphoric acid, and 1 lb. of magnesia. We may replace these substances by abundant manuring, and we are bound to say that

the best rotation will not obviate the necessity for manuring; but even then it is well to crop the plot with Peas, Spinach, Lettuce, and other plants that occupy it for a comparatively brief space of time, and necessitate much digging and stirring; for these mechanical agencies combine with the manure in preparing the plot to grow Potatoes again much better than if the land were kept to this crop only from year to year. If we could mark out a plot of ground into four parts, we should devote one plot to permanent crops—such as Asparagus and Sea Kale—and on the other three keep the crops revolving in some such order as this:—No. 1, short-lived crops, such as Peas, Spinach, and Saladings, to be followed by Cabbage-worts; No. 2, tap-roots, such as Carrots, Parsnips, and Beets; No. 3, Potatoes, Turnips, and Onions. In the next season the original No. 2 would be cropped as the original No. 1, and the original No. 3 as No. 2. In the next year the original No. 3 would be cropped as the original No. 1; and so on: every crop to be prepared for by vigorous stirring of the ground and manuring; and if the subsoil were good, we should trench it two spits deep for every crop.—*Sutton's Amateur's Guide*,

GLASS HOUSES.—CONSTRUCTION AND VENTILATION.

THE modes of constructing and ventilating every description of hothouse are varied in character to meet the wants—to minister to the whims, and shall we say the prejudices of all those engaged in plant cultivation, be it for the floriferous or beautiful character of the plant, or for what it yields to gratify the palate. The resources of the manufacturer of plant-houses are apparently unlimited, for no sooner is one point gained than another obstacle, requiring remedy, confronts itself, and so, again, the ingenuity is taxed, fresh ideas crop up, and are theorized upon for some little time; the point becomes clearer and clearer to the mechanical mind,

the materials are put together by way of experiment, and the problem, that has probably called forth many anxious thoughts, is solved. There may appear little on the face of a glass-house sketch that seems to involve profound thought, or a play of ingenuity, and yet upon the details of its construction very much depend the prolonged life and health of the inmates which it is intended to protect. The proper form or outline of a house intended for the growth of plants is one germane point; the proper means provided for ventilation is another. Upon these two wants being properly met depends very much the success of those engaged in plant culti-

vation. It seems an easy thing to build or ventilate a house of the proper kind ; and so it is, but how often do we see such things very imperfectly done. Certain hypercritics averred when they saw the Glass Palace of 1851 erected, that it was the simplest piece of structure ever raised for any grand object, but in its simplicity people generally recog-

study and cater for, and so all the ills that plant life are subject to, fall less or more upon the plants in such an atmosphere. If we were cultivating Pelargoniums, or such soft-wooded plants that do not grow to great stature, then such a form of house or pit as fig. 1 would be the kind of thing wanted. If there were larger plants of a miscellaneous

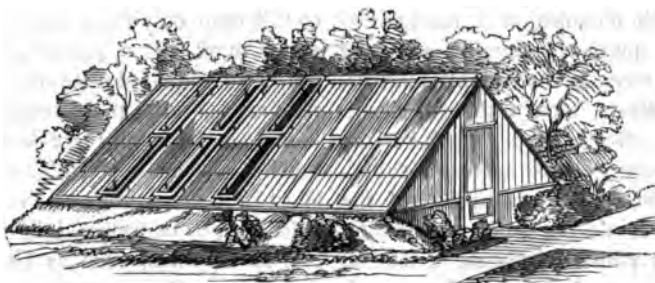


Fig. 1.—House for Pelargoniums and other Soft-wooded Plants.

nized the greatness of the conception. Magic-like it grew until the great transept covered some of the gigantic trees of the park. Living they were when the palace was reared ; living they were when the temporary canopy was taken down ; living they are at the present day ! It is in this adaptation of means to an end that brings with it success.

character, such as Azaleas and Heaths, and New Holland, plants of a hard-wood character, then such a house as fig. 2 would be a good medium for their growth and health. The one, as shewn by the section (fig. 3), has a central path, and shews that it is heated by three pipes. These pipes may be covered over with a wooden, or slate, or stone stage,



Fig. 2.—House for Azaleas, Heaths, and other Hard-wooded Plants.

the plants set thereon, or the house might be used for an orchard house, planting out the fruit trees in the borders on either side the passage, or standing them in pots, as the case may be. With the means of heating at command any kind of plant or fruit tree might be grown even from a tropical climate. The atmosphere, as will be seen in this structure, is limited, and may be easily heated ; it

the plants set thereon, or the house might be used for an orchard house, planting out the fruit trees in the borders on either side the passage, or standing them in pots, as the case may be. With the means of heating at command any kind of plant or fruit tree might be grown even from a tropical climate. The atmosphere, as will be seen in this structure, is limited, and may be easily heated ; it

is, indeed, a very serviceable structure for general purposes, and is such a kind of house as is likely to suggest itself to many villa gardeners.

By the section shewn of fig. 2 (see fig. 4), the reader will see that the house is purely a

not recommend a simpler or better structure for plant growth.

As an additional inducement for the villa gardener to build, we present two modes after the same principle as the two already illustrated, but this time of cheaper construc-

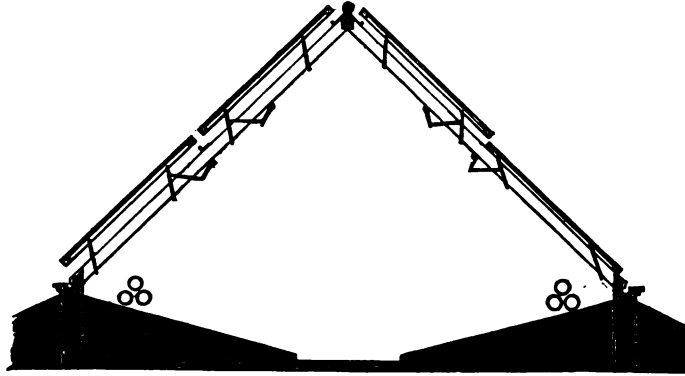


Fig. 3.—Section of Fig. 1.

plant house with side staging, and a central stage in tiers to keep the plants near the light, and to accommodate a great number in a given space. Although we said that this was the sort of house for hard-wood plants, we did not intend to convey that it was not

Any one having a wall can get these houses erected at considerably less cost than the span-roofed houses above illustrated; and very useful houses they are, too, of their kind. Fig. 5 would be a good form for a Vinery or Peach-house, or for the growth of any fruit.

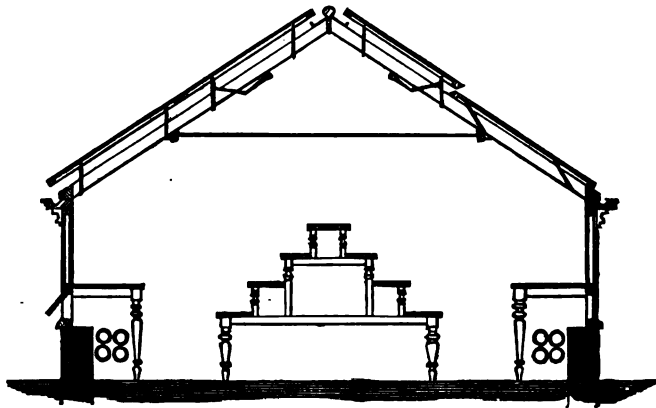


Fig. 4.—Section of Fig. 2.

good for soft-wood plants as well. With the eight rows of piping, there is sufficient command of heating power, even supposing the winter were more than usually severe, to provide the heat necessary for what are called stove plants. As a regular house for an amateur, either as a greenhouse or stove, we could

tree; and the construction is so simple, the details so plain, as to induce even the most cheese-paring economist that had any regard for fruit to indulge in this bit of luxury. With the mode of ventilation on the sloping sashes, there is no need for either an independent sash at top or bottom, and the ex-

pense of construction and erection, which is considerable, is saved. Fig. 6 has a front sash to make it useful for plant culture, giving head room to plants of ordinary stature from front to back. It is a kind of house that is in great demand by amateurs; and, taking cheapness into account, with light and proper

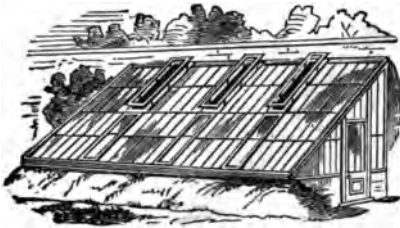


Fig. 5.—Vinery or Peach House.

ventilation, we do not think a much better could be found.

As to ventilation, as we have already and frequently recommended, its consideration can scarcely be considered too important. The more ventilation we can command without interfering with the stability of the plant structure, the better the principle of the house for plant-growth purposes. There are so many patent systems now-a-days afloat that one has a delicacy in approaching the subject at all, because in the dealing with it these patents run so closely one into the other, that it takes some ingenuity, and not a little trouble, to avoid giving the credit to whom the credit really belongs.

The Paxton system was long considered a good one; now, instead of, as it were, tilting the sashes up edgeways, we have the mode of William Richardson & Co., of Darling-
... furnished us with the
... this article. This
... the sashes after the mode
... diagrams shew. This has
... sash overlapping its
... when rain falls, un-
... the day
... good
... the general con-
... venting from below over
... hot-water pipes without disturbing the
... these vertical lights often

moved for purposes of ventilation, get out of order, and the tear and wear is greater in proportion to the other parts or features of the house outline. As will be seen in fig. 6, the ventilation takes place through wooden shutters immediately under the glass front. We cannot do better than give the patentee's own words in their description of this mode of ventilation.

"The patent system of ventilation is effected by narrow openings in the roof (about 9 inches wide) the full length of the lights from top to bottom, and from 4 to 5 feet apart, covered with glazed frames made perfectly weather-tight, with grooves up the sides, fitting down on to galvanized iron tongues; these frames are 4 inches wider than the opening they cover, and when lifted are clear above the fixed lights, leaving an open space at both sides as large or as small as may be desired, thus allowing a free and even circulation of air throughout the house, and at the same time protecting the interior effectually from rain, wind, or a direct draught upon the plants. These ventilating roof-lights are made in either one or two parts, as shewn in the various sections, each separate set or range from one end of the house to the other being simultaneously opened and regulated by a single handle placed in the most convenient position, and balanced in such a way as to be easily worked by a lady. Any ventilating light can, if desired, be thrown out of gear, so as not to

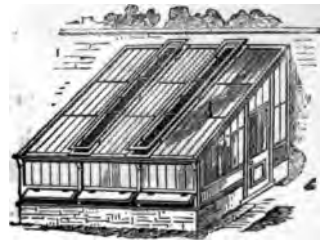


Fig. 6.—A Cheap Greenhouse for Amateurs.

open with the rest, or it may be lifted entirely off for glazing without the removal of screws.

"In the houses with front lights, bottom ventilation is obtained by wood-panelled

flaps along the full length, and about wide, these also opening and being l by a single handle to each range, rding complete protection from the ; the air is thus admitted below the any foliage and immediately over the

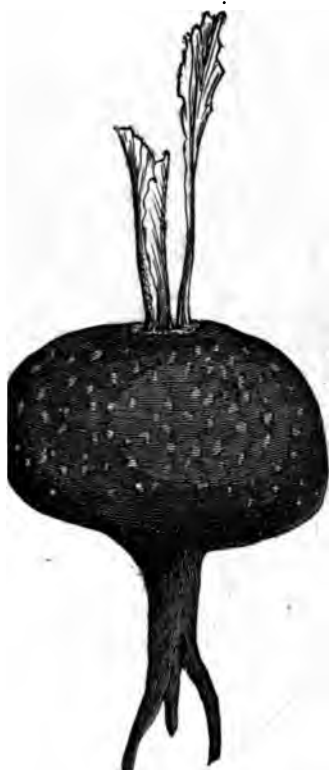
hotwater pipes, by which it is slightly tempered on entering the house."

What is an advantage, the houses are so constructed as to be removable at will, and refixed, as the patentees describe, "without a pane of glass being disturbed."

NEW AND RARE PLANTS.

SKATSKOFF'S CHINESE RED SUMMER RADISH.

HEN seedsmen and others are busying themselves so much about novelties in aable way, we recommend Scatschkoff's



Skatschkoff's Chinese Red Summer Radish.

as being one of a sort likely to find with those who relish a salad. As

our engraving shews, it is distinct from most kinds offered, and the quality, we understand, is such as to secure for it more than mere flitting favour. It is a Chinese variety sent to the Russian garden at St Petersburg by M. Skatschkoff, the Russian Consul in China. It is reddish, with green flecks upon the roots, and Professor Regel says that it combines the delicacy and agreeable taste of the Radish, with much beyond the ordinary size. To those who like to munch a good-sized Turnip-Radish we would say, buy a packet of seed, and sow as soon as possible. The whereabouts to find it, however, we are not in a position to inform our readers. It will, doubtless, be got at by applying to the Director of the St Petersburg Botanic Garden.

LEUCADENDRON ARGENTEUM (*Protea argentea*, *Linn.*)

The Silver-Broom (Silver Tree), or Silver Pine of the Cape of Good Hope. No Pines or Firs are found in Africa south of the Sahara, but there grows at the Cape of Good Hope a plant which bears cones which deceive those who are not botanists; the leaf (fig. 2) is long, stiff, hardish, willow-shaped, but without any foot-stalk, and has an almost unequalled lustre of frosted silver when looked at in certain lights; it is densely clothed with a fine woolly pubescence, and ciliated, or hairy, along the margins, and is marked by a multitude of nerves, more or less longitudinally disposed, and crossing

over and under each other like varicose or swollen veins. The seed (fig. 3) is from Gærtner's "Carpologia;" the branch of it (fig. 5) is a copy of that given by Burchell in his



Fig. 3.—*Leucadendron argenteum*—Seed.

"in this country it forms a real ornament of the greenhouse, where its beautiful silver

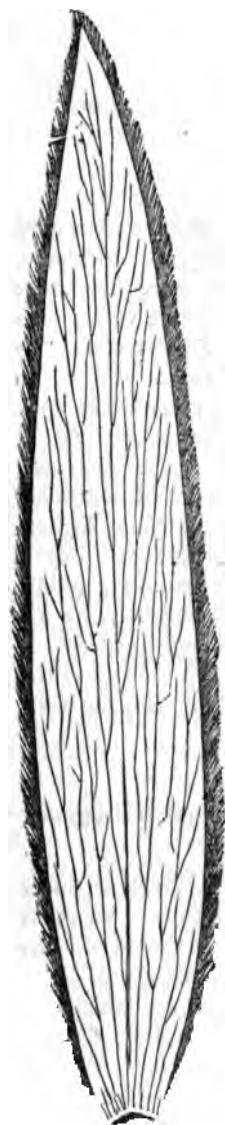


Fig. 4.—*Leucadendron argenteum*—Male Flower.

leaves furnish a strong but agreeable contrast with the more common green of other plants." The "Botanical Magazine" mentions that it was cultivated

Many of the scarcely hardy coniferæ might be made to grow in proper houses. The conservatories, as we generally see them, are too hot, and, consequently, no half-hardy tree that delights in abundance of air passing about and over it can live comfortably in a close heated atmosphere. Even Bedwill's *Araucaria*, and several more of the family, would grow much better in a cooler, clearer house than we see them growing in. Plenty

we have copied the figure of the flower, that nothing like this, so far as he knows, has ever been received from the old world; but that it is evidently allied to a species gathered by Ruoz and Pavon in Peru.—*C. caudatum* of Dr Lindley.

It is stemless, with large fleshy vernacular roots; leaves, 10 to 12 inches in length, two arising from the same root; oblong, coriaceous-carnose, dark green, subcanalicu



Fig. 5.—*Leucadendron argenteum*—Branch and Cone.

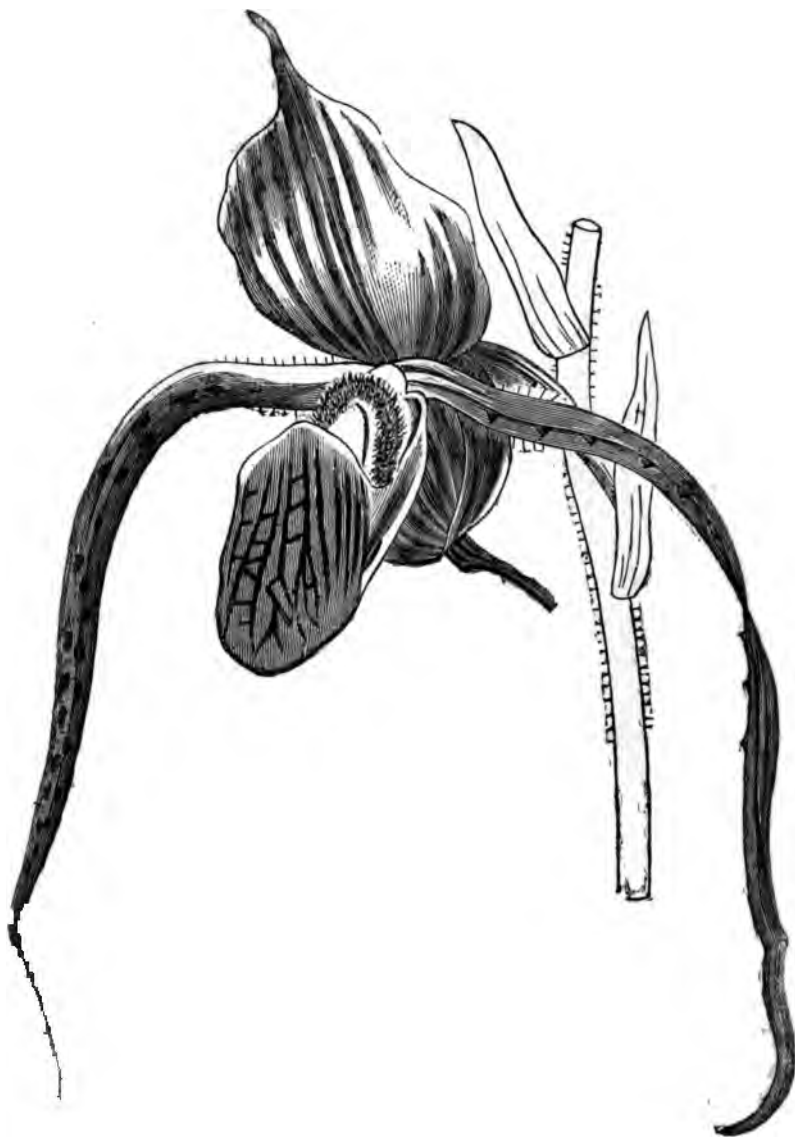
of light, and only sufficient heat to keep back frost, is what is wanted for such an ornamental tree as the Silver Tree of the Cape.

CYPRIPEDIUM STONEI.

An importation by Messrs Low & Co., from Sarawak, by Mr Day of Tottenham. Of this species Hooker says in the "Botanical Magazine," tab. 5349, from which

late, very obtuse, with a short mucro. Scape radical, with a large sheathing bract at the base, terminating (in the specimen from which the description was taken) in three large bracteated pedicelled flowers. Dorsal sepal white within, streaked and mottled with dark purple externally, and tinged with yellow—the lower sepal (two coalesced into one) similarly coloured. Petals, 4 to 5 inches long, curved downwards, tawny yel-

low, lined and blotched with purple. Lip shaped like a Turkish slipper, standing forward horizontally, the sides involute white, the rest purplish, with red reticulated veins. white fleshy disc, or sterile third stame. Another short branch of the style bears stigma, a large cordate fleshy disc, yellow margined, with a thick filamentous fringe.



Stems of the same plant as the one already mentioned, the native habit of this magnificent species is near Sarawak, Borneo.

PRUNING SHEARS.

IF the many implements requisite to the proper management of the garden, there are so useful as the pruning shears, and

attached to the tree or shrub as firm and smooth as if cut off with a knife. They are used in the same way as the common shears, and are very convenient for reducing the size of shrubs or bushes, and in clipping hedges

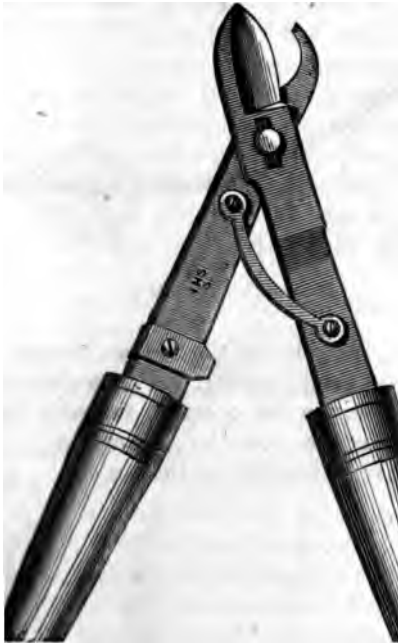


Fig. 1. - Pruning Shears.



Fig. 2.—Common Garden Shears.

we give an engraving (fig. 1) of an implement of a powerful description. It will be seen to differ from the common or ordinary shears (fig. 2), in having a moveable centre. By the motion of one of the blades, by which means, instead of a crushing-cut, they make a clean-cut, leaving the section of the part

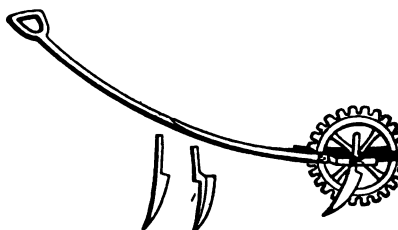
of Roses or other select plants. They are not difficult to use even in the hands of a lady.

The common garden shears (fig. 2) are too well known to need any description. They are indispensable in every garden, large or small.

M'INTOSH'S TURF VERGE CUTTER.

Another very useful, and we may say necessary implement is the edging knife for paring the verges of lawns. Properly to handle this implement required some little skill. The verge cutter we are now about to describe was invented more than fifty years ago by Mr M'Intosh, and was first described by Loudon in the "Gardeners' Magazine," vol. i., page 139. Although so efficient an implement, it is very little known, but certainly wherever it has been introduced it has completely superseded the old implement. With this verge cutter a man may cut as much in one day as he will cut in four or five days with the one in general use. Unless there be a long straight line to be edged, a garden line is unnecessary, but where one is used it may be placed between the wheel and the coulter, or cutting part of the implement. A certain degree of pres-

sure is necessary on the handle when the ground is hard; and the kneed coulter shewn to the right in the engraving) may be employed when the edgings are not



M'Intosh's Verge Cutter.

regular. When in use, the coulters should be sharpened every morning, and several should be taken out by the operator, in order that the instant one loses its cutting edge place may be supplied by another.

Arboriculture.

EVERGREENS FOR SMALL PLEASURE GARDENS.

YING, or doing just what others have done, is a far too prevalent habit our people. If one man plants a Norruce or Austrian Pine in front of his or upon a lawn, all of the neighbours ately follow the example, and procure the kind, without the least regard to garden or adaptation to the surroundings.

There is scarcely a garden, either in the portions of our cities or suburbs, that has, at some period in its history, contained one or more of these coarse-growing trees. More beautiful or desirable trees exist than the Spruces and Pines; they are as unsuitable for small gardens as an elephant would be for a house-pet. Growing in nursery rows, they appear in perfection of comeliness, and the novice upon them as they are at the time—they will be at some future day—that require room to expand, or perish for want of it. By the free use of the hand and pruning-shears, the larger growing evergreens may be kept within certain limits; but graceful and natural outlines are destroyed in the operation. Through the enterprise of our leading nurserymen, the way for planting the coarse-growing trees, and then resorting to the knife, is made easy, and we now have an abundance of beautiful dwarf evergreens, alike suitable for small gardens or toning down large groups on extensive grounds. By the use of dwarf trees, a great variety can be introduced in a comparatively small space, a miniature forest of evergreens reared within the limits required for two or three specimens of the larger species.

A number of dwarf species in cultivation

is far too great to be enumerated here; but we will mention a few that seem to be almost indispensable in every well-arranged garden, and also add that they are all hardy in this country.

Abies alba mana, or Dwarf Spruce.—Grows only about 1 foot high, but very compact, and of a deep green colour.

Abies Gregoryana, or Gregory's Dwarf Spruce.—A very handsome variety, but larger than the preceding. Habit similar to the common Norway, but more dense, and leaves and branches much smaller.

Biota Meldensis.—A very handsome variety of the Chinese Arbor-vitæ, with very minute leaves, and of an exceedingly dense habit. As it grows very readily from cuttings planted in the open ground, some of our gardeners are using it extensively for edgings, in place of the dwarf-box.

Biota aurea, or Chinese Golden Arbor-vitæ.—The light green or golden colour of the foliage makes this a desirable plant in a collection.

Buxus, or Box.—There are several species and varieties, all of rather slow growth, and suitable for small gardens.

Junipers.—Like the Box, there are many desirable species and varieties. *J. hibernica* (Irish Juniper) and *J. suecica* (Swedish Juniper), are small, but compact, slender growing trees, requiring but little space.

The *Juniperus pendula* (Weeping Juniper), is also a very desirable species, being one of the most graceful in habit. There are also several trailing species, such as *J. prostrata* and *J. squamata*, that are worthy of a place among the best.

Pinus.—There are a few species and varieties of dwarf Pines that may be admitted into

grounds of limited extent—among the best we have seen, the *Pinus Strobus nana*, or a dwarf variety of the Weymouth Pine. There is also a very pretty variety of the Scotch Pine (*Pinus sylvestris*), and another of the Swiss Pine (*Pinus Cembra*); and the old *Pinus Mugho*, may be introduced as a dark background for the more rare and less vigorous sorts. In addition to the above, the *Thujas*, or American *Arbor-vitæs*, should

receive a due share of attention, particularly the dwarf varieties. The Yews are also desirable, and the Golden Yew has few equals for giving brilliancy to a garden.

Among the many hundreds of species and varieties of evergreens cultivated by nurserymen, there are certainly enough to suit every individual taste, as well as every situation, those enumerated above being merely types of species to select from.—*T. M.*

PEACH TREES ATTACKED WITH MILDEW.

THERE is a great complaint this season of Peach trees being attacked with mildew. Many first-rate gardeners [who have grown Peaches for years with great success, complain that in spite of all their precautions mildew has put in an appearance, and not only destroyed, as it invariably does, the crop of the trees affected, but the trees themselves. On looking into several houses, my idea is that it is more due to the particular locality than to any want of right management. I could name places where the houses are so sheltered with walls, and then with plantations at the back of the walls, that no system of ventilation would seem sufficient for oxygenizing the pent-up atmosphere. The consequence is, that this closed up state—this state of quietness—is favourable to mildew spores, and then, once they they have got a footing, every gardener knows how subtle they are in their migrations, and how fatal to the combined growth and health of the tree. I set down the appearance and propagation of mildew to the sheltered condition of locality more than to a want of attention. Doubtless, there are some gardeners, not quite so experienced as others, who may unknowingly allow such a condition of atmosphere as may induce the appearance of mildew, but they are in a minority.

What I would recommend is more ventilation, both during day and night. It is by far the best preventive, and every one knows

that after the mildew has stolen a march upon the choice ground, the best antidotes are sulphur syringings and sulphur fumes, or an atmosphere charged with sulphurous acid. Some may say, if we throw open our ventilators to the utmost limit we endanger the crop of fruit. That is only in cases, we would not apply, where severe weather sets in, and we have had no weather to destroy Peach blossom under glass, even supposing the house had been ventilated. There is too great a desire shewn to shut up a house—shut out the ordinary atmosphere, and keep the climate for the trees as an house-wife prepares a climate for mankind. The cases are totally different. Plants must have ventilation, and plenty of it, too, even supposing they come from a tropical climate; the success lies in selecting the right time for exchanging the air of the artificial climate.

But it will be seen Peach trees mildew very frequently out-of-doors. And so they do; but it will be found attributable, on inquiry or examination, to either an unhealthy state of tree, improperly ripened wood, or the position so surrounded with trees that the wall is practically preserved from not only every wind that blows, but even from the usual movement of the atmosphere. So long as such a state of things continues, there always will be mildew, and the trees will never be healthy, and yield of fruit consequently never satisfactory.—*To:*

The Veterinarian.

GARGET IN COWS.

Every species of animals we have abundant evidence that causes frequently to produce in each special forms of disease. There is no doubt, whatever, that the temperament, and peculiarity of sex, and species differ in each variety, and the tendency to suffer under similar influences thus is modified, and productive of dissimilar results and signs. In horses, for instance, the wet and cold creates a liability to the throat and influenza; the same causes produce in dogs the so-called distemper; in cows the special manifestation is in the form of garget, or, as it is variously known, *itis*, inflammation of the udder, down the udder, sore udders, &c.

In proportion, also, as organs are unduly excited in their functions is the liability to be influenced, for by reason of a great quantity of blood requisite for their support and maintenance in function, the material for congestion and inflammation is already present.

Thus, when the cow has calved, the quantity of the udder is greatly increased and she has a very great susceptibility to all causes of disorder. Garget is therefore common in the first year after parturition, particularly when they are subject to want of care, exposure, &c. If the udder gets wet and cold, or is allowed to lie on old and damp stone, ground, &c., guard almost safe to follow, and, when added to this, the system of feeding is irregular and the cow is otherwise, causing indigestion, the effects are frequently more severe.

Under such causes, injuries exert a serious influence upon the secreting structure of the udder, and the practices of leaving milk in the teats, instead of milking effectually, as well as allowing the animal to go too long, and otherwise causes that must not be over-

A large organ like the udder, receiving so much blood, and performing an extensive and most important function, cannot be involved in acute disease without causing serious constitutional disturbance. It is, therefore, worse than useless to think of alleviating such a state by local remedies alone. Young cows usually suffer most severely in their first attacks, but when these succeed each other periodically, they are likely to grow less intense on each occasion, and eventually assume a chronic or slow character, but the final result—obliteration, or loss of secreting power of one or more quarters—is not less certain. At the time of each parturition, when blood rushes with great force and quantity to the udder, that result is likewise hastened in a manner totally independent of the operation of physical or other causes. The first effect of disorder in the udder is to produce milk of an improper degree of consistency; it probably contains an excess of caseine or cheesy principle, in other words fibrin, in which the excess of blood in disorder abounds. It thus coagulates more speedily, and within the milk ducts, rendering it impossible for it to come away by ordinary means; and while it remains great irritation and pain are set up, which of course augments the original disease. The string of curd, which may be sometimes extracted by careful manipulation, is the coagulated milk having assumed the form of the tube in which it has been confined.

One of the direct objects in the treatment of garget in the acute stages is to reduce the quantity of blood going to the udder, and for this purpose purgatives are usually employed. But when the chronic stages are present it is not wise to use too much medicine of that nature, but to endeavour by means of continu-

ncy of tar, when death is not far

The first and after symptoms indignant and copious bleeding, according to the strength of the animal, and the immediate administration of active purgatives, the quantity of which is not less than 1 lb. Epsom salt mixed with $\frac{1}{4}$ lb. treacle, and 2 oz. ginger on thin gruel or warm water, given in doses every three or four hours after violent purgation is effected. Sometimes constipation is so obstinate that it takes three or four days before the bowels are opened; but as no hope can be entertained until action comes on, the administration of medicine must be persevered in, let it gently trickle down the throat from the commencement, increasing the quantity as it goes on, and adding from one to two or three tablespoonfuls of spirits of turpentine, or 3 drachms of laudanum to the doses, to act on the kidneys.

During the above treatment, the strength of the animal must be kept up by pouring warm well-boiled gruel, composed of equal parts of fine oatmeal and linseed-meal; and, if the animal will eat, give fresh cut grass, or sliced roots. As a rule, when action is effected, the safety of the animal is secured; but the laxative state of the bowels must be kept up by gentle medicines and by giving relaxing food, the best of which is made of bran and linseed meal, well mixed with boiling water, and let stand till warm. As the animal becomes contented, it must be gradually accustomed to solid food, and in increasing quantities.

Term red water in sheep is generally quite a different disease to that in cattle, and is, in reality, dropsy, getting the red water from the colour of the fluid effused in the cavity of the belly, which comes on so suddenly from inflammation caused by cold and wet pastures, swelling with the abdomen on the cold that it is no unusual thing to find the animal in the flock, though seemingly right in the evening, dead in the morning; the disease is also very destructive as it arises from the same causes. An experienced and careful shepherd will, however,

frequently before nightfall be fully warned if he observes a sheep lagging behind or separate from the flock; and if the animal protrude the head, pant, and breathe laboriously, and if the belly is more than usually full, he should bring it into the house, bleed it copiously from the jugular vein, and give an active purgative, the best for which is a tablespoonful of spirits of turpentine mixed with three tablespoonfuls of linseed oil, which will also act as a diuretic. If taken in time, before much effusion takes place, the animal may be saved, and should then be put on fresh and more wholesome pasture.

The true red water in sheep is, however, the same as that in cattle, viz., bloody urine, and many suffer and die of it without being suspected, particularly ewes having lambs; intense and weakening dysentery is observable for days and weeks, the urine is bloody, and the poor animal becomes so debilitated that she loses the use of her hind legs, and ceases to secrete milk. A ewe in this condition came under our notice lately; she was not able to stand, the lamb was nearly lost, both were brought into the house, a tablespoonful of spirits of turpentine, mixed with two of linseed oil, was at once administered, and she and the lamb were drenched with plenty of warm fresh cows' milk and fine oatmeal gruel, with a little ground ginger in it; in two days she got up, began to come to her milk, was carried out to some nice grass, where she nibbled a little, and eventually got up and walked about. She is still weakly and under treatment, being brought into the house in the evening, and getting plenty of warm milk, oatmeal gruel, and the ginger, and is likely to do well; the oil and turpentine did well, the oil cleansing out the bowels of any irritant matter, and the turpentine on the kidneys and urine, which has lost its red colour.

An experienced attentive shepherd is an invaluable servant, and should have all the necessary assistance required. This season scab and vermin have been and are more prevalent than usual, keeping the poor animals in a continued state of torment, as

many extensive flock-masters know to their cost. The lambs have taken the scab as well as the vermin from their dams, and fleeces are broken to an extent unknown for many years past, to the great deterioration of the wool and loss to the owner, so that the profits derivable from the rise in sheep and wool have been neutralized to a great degree, and all owing to neglect. No extensive flock-master should be without a proper shepherd, who would scrupulously attend day and night to the duties of his calling ;

but, at the same time, he should have adequate assistance, to enable him to take that rest which nature requires, and do himself as well as his employer justice. The human machine is not one of iron, but we regret to say that many employers too frequently forget that it is so, and, as is the case in the present season, they have paid dearly for it in the unclean and deteriorated state of their flocks, many having had to shear them prematurely, thus exposing the poor animals to the cold and wet.

SOME OF THE CAUSES OF DISEASE IN STOCK.

STABLES.

THERE are an innumerable number of ways in which stables may prove injurious to their occupants, and I will limit myself to a brief mention of the important points. If they are too dark, they are apt to induce a morbid sensibility of the eyes to the action of light, which predisposes to inflammation of these organs (ophthalmias) ; if, on the contrary, they are very light, or arranged in such a manner that the light falls directly on the eyes, they are equally hurtful. Animals are often placed in very narrow stalls, or too close together, when their repose becomes unsatisfactory, and injuries from abrasions and kicks are frequent. The floors of stables are sometimes uneven or contain holes which occasion various troubles—lameness, sprains, dislocations, &c. Stables built of stone, and especially those which have the floor below the level of the surface of the earth, are usually damp and cold. Entering such places, one feels a disagreeable sensation as though he were in a cave. The walls are found damp, sometimes even the roof leaks through the eaves. The condensation of vapour in the air, being cold and damp, prevents the evaporation of the secretions of the skin, and diminishes the exhalations from the lungs, besides being too imperfect to supply the blood with

oxygen for the support of the body. Thus we find three very important functions of the organism seriously impaired by this condition of the habitation, leading to catarrhs, pulmonary consumption, cutaneous and rheumatismal disease, and various constitutional maladies. There is another class of stables, without ventilation and without proper management, which is, perhaps, the most frequently met with, and which is equally destructive to health with those I have just noticed—I mean those which are warm and damp, and in which the manure is allowed to accumulate. Going into these stables with a light it is at once seen to burn dim, shewing the unfitness of the air to support combustion or life. The ammoniacal vapours in the air irritate the eyes, and other vapours and animal products, coming from the various excretions and fermentations, act upon the organism in the most injurious manner. More than this, the air, already loaded with moisture, cannot sufficiently take up the secretions from the skin, and the exhalations of the lungs ; consequently, the mucous membranes, the kidneys and other organs are obliged to increase their labours in order to make up for the deficiency, while the manure forming the floor acts upon the feet. What then, you ask, is the result of so many unnatural conditions ? We will see.

submitted to these influences are to form fat quite rapidly, but an examination shews it to be of a bad quality; it is pale and flabby, and can be pre- but a little while, and the animals lves contract slowly pulmonary con- on, while, in addition, the pregnant are predisposed to abortions. Even not all, for the poisonous emanations fill the air are constantly being ed into the lungs, are being swallowed he food, and thus find their way to part of the body, on which they exert injurious influences, giving birth to es of the blood, to fevers, and to vari- nstitutional maladies, which occasion- most annihilate the farmer's stock. So ave sketched but two classes of stables; en these there are numberless varieties. pes have been extremes, in order to he various hurtful influences that are ced by badly formed and badly man- tables.

DICINES, MEDICAL TREATMENT, ETC.

administration of medicines to healthy ls, in the hope of preventing disease, is y unjustifiable, and often causes the ions that are so much dreaded. Many is bleed, and give purgatives and ics and various secret preparations t continually, but the results of this ce are not such as to make it desirable. it may be safely said that, with the ex- n of inoculation, which is only applic- for a very limited number of diseases, is no medication as certain to attain bject as proper dietetic and other care. giving of medicines entirely unsuited ie disease, as is often practised by veterinary charlatans of our country, r always aggravates the condition, n many cases is the cause of death. are also a number of ridiculous opera- which are performed by the same am-

bitious beings, which in some cases are inno- cent enough, but in others produce much suffering and the worst results. Among these, it is almost needless to mention, are the boring of the horn and insertion of salt and pepper for that chimerical disease known as "hollow horn," the operation for "wolf in the tail," the extraction of extra teeth as a cure or prevention of inflammation of the eyes, the cutting out of the "hooks" for the same disease, cauterization of the mouth for lampas, and many others of the same nature. It is very strange that sensible stock-owners will allow persons whom they know are as ignorant as a child of the principles of medicine thus to maltreat and injure their stock; and yet it is done every day, and many valuable animals are annually sacrificed in this way. It needs only a moment's consideration of the difficulties attending the diagnosis of diseases with animals to convince anyone of the utmost utter impossibility, in most cases, of even telling what is the matter, without having first given long years of careful study and observation to the subject.

PARASITES.

The parasites which may affect our domestic animals generally belong to both the animal and vegetable kingdoms, and they find lodging place in all parts of the body, from the skin to the most protected and delicate organs. Their number is so great, however, and the diseases which they produce so various, as to make it impossible to enter into particulars at present.

CALCULI.

These are bodies of various sizes, and are usually formed of earthy salts, which may exist in the stomach or intestines, and in the different secretory and excretory organs and their ducts; they are of a somewhat dissimilar composition and character, and the diseases which they produce are equally numerous.—*D. E. S. in Country Gentleman.*

The Dairy and Poultry-Yard.

THE CURING OF CHEESE.

IN an address before the Ontario Dairymens' Convention recently, Mr A. Willard, the president, made the following remarks in the course of his address:—

The great question for the attention of American Dairymen to-day is the proper curing of cheese upon the shelf. The subject has been almost entirely ignored by our dairy associations and by the dairymen of America. The curing of cheese has as much to do in securing fine flavour and quality as the manipulations of the milk and curd.

A well-made cheese when removed from the press to the cheese room, contains a certain amount of moisture, a part of which must pass off in the ripening process, or the cheese will not acquire good flavour. If the cheese is kept in a damp or badly ventilated place, the excess of moisture will develop another class of fungi, a different kind of fermentation than that required for good cheese. From experiments made, it has been found that 2000 lb. of newly made cheese will give out nearly 2 lb. of moisture during twenty-four hours, and the sooner the room is cleansed of such moisture the better; for if it is condensed and falls back upon the older cheese, or the cheese is constantly saturated with these exhalations, it will injure the flavour. We turn newly made cheese daily, in order that this moisture may readily pass off, and the fermentation of the cheese be carried away in a uniform manner. Ample ventilation then is important—ventilation that shall carry off the fumes of decay and cheesy exhalations. From a large number of well conducted experiments, the principle has been established that a temperature of about 70 deg. is the best for curing well made cheese;

to secure fine flavour and a rich mellow texture as well as long keeping qualities, the growth of the fungi, or fermentation, must be slow and uniform. You may force it forward by high heat and light salting, but always at the expense of long keeping qualities. The system of preparing cheese for market at twenty days' old is a most pernicious system, and is the source of fearful losses to American dairymen every year.

It is admissible only when you know where to place your goods and know they are to go into immediate consumption. In 1866, I saw the result of such manufacture in numerous instances—cheese that come in good condition, and if sold at once would command 76s.; in a week's time so fell in flavour that it went begging at 50s. I know that American dairymen and American dealers often boast of our system, because we can make cheese that is so soon ready for market that the shelves can be cleaned from month to month, but they do not couple it with the fact that much of our cheese sells in England for 30s. to 40s. the cwt., and even less. Some one loses on these goods, for no cheese of good flavour, that can be held, would be sold at such a fearful loss.

I believe that a good many old curing houses could be improved by building around an inside wall, leaving 6 or 8 inches space between it and the present wall, and by arranging double windows. It has been suggested that saw-dust or some non-conducting substance be placed between the walls. I saw something of this recently in Ohio. It was a storehouse for keeping late made cheese, after it was cured, during the winter. Messrs Horr & Warren, of Wellington, have a storehouse of this description, where, on

th of January, they had over 10,000 of cheese stored in boxes, and though rather had been intensely cold, no was had from frost. I am inclined k that the plan of dry, well-ventilated or basements could be adapted, so low even temperature in hot weather e secured at little expense and trouble. nics with whom I have consulted affirm old spring water flowing in large metal along the ceiling and then out of the g, where it may be utilized for other es, would be sufficient to reduce the rature to 70 deg. or below, even in ottest weather. Hot water pipes ed about the room, and connected with iler, would be the best means of raising mperature in cold weather when heat ired.

e years ago I built a farm dairy with curing room in the second story, even with the floor on two sides of the were openings through the sides of the g, five on a side, provided with wic-

kets so as to regulate the quantity of air to be admitted as desired. In the centre of the room there was a large ventilator, running from the ceiling up above the roof of the building, also provided with a wicket for regulating the air. Here I experimented from time to time in the curing of cheese, and I found even with this arrangement that a temperature not above 75 deg. could be maintained in the hottest weather of summer, by regulating the wickets, and by the use of water upon the floor, which in its rapid evaporation would reduce the heat as desired. By attending to this matter, I found that cheese could be preserved in good flavour throughout the season, when the factories and farm dairies about were not able to keep it, and my experiments have convinced me that any temperature above 75 deg. could not be safely allowed for curing cheese, and that with proper attention to temperature, well made cheese could be cured so as to retain a mild sweet nutty flavour for a long period.

FACTS AND HINTS ABOUT POULTRY.

POULTRY ON ALLOTMENTS.

THE benefits which have already been accomplished by the provision of plots is universally acknowledged ; but we wish to point out is, that in many much greater return may be obtained from the same piece of ground by keeping it than by raising crops. We say in cases, because the capacity to understand and carry out sound methods of management is by no means universal, but is vital to success. This being granted, however, several advantages of thus employing an allotment may be pointed out. In the first place, valuable manure will be secured for other allotments, or for parts of the still reserved for growing vegetables. The growing and caring for live stock

both demands and creates a higher kind of intelligence than the cultivation of ground, and would tend to encourage feelings of more humanity towards the lower animals than notoriously exist at present amongst the labouring class. And, finally, while digging in a garden is exhausting toil, which being of the same character as the long day's work already over, tends to exhaust that strength which should be given to the regular employment on the following day, the attending to poultry would be both work of a light character, and a pleasant change, beneficial alike to the mind and body of the labourer. For these and other reasons, which need not be pointed out, we would therefore seriously ask those who have at heart the real welfare of their poorer brethren, to seek to encourage such a state of things.

FATTING FOWLS BY MACHINERY.

The food employed by M. Martin consists of fine maize and barley-meal, mixed in about equal quantities; to this is added a portion of lard, and the whole is then mixed smoothly with milk, so thin as to be almost liquid. The feeding-house is a large airy building on the summit of a hill, and is furnished with three revolving octagonal stands, which, as they turn on their upright axis, present each side in succession to the operator, precisely in the same manner as the revolving show-stands so often seen in shop-windows. Each side of the stand contains five perches for the fowls; and as each perch roosts five birds, the stand accommodates 200 fattening birds. The perches are arranged over each other, and under each perch is a board sloping backwards, which throws all the droppings into the centre of the machine, and effectually prevents them falling on the birds below. Every morning a little straw chaff is thrown upon them, and the whole taken away in a barrow running under, by which means the fowls are kept perfectly clean. The most peculiar thing about M. Martin's management, however, is the singular fact that the fowls are *tied upon their perches* by thongs of raw hide, which are passed round their feet, but leaving them otherwise at perfect liberty. Partitions or upright slabs fixed to the perches divide them from each other, and keep them practically in separate compartments, with the great advantage of a free circulation of air. The whole apparatus is frequently disinfected with sulphate of iron, which keeps the birds perfectly free from vermin. The feeding is done by a machine which contains the food in a reservoir. The operator has a seat, which he can move to any part of the stand, and by a lever he can push with the hand causes the frame to revolve so as to bring the next bird opposite the feeder, and the feeding is thus pushed with such rapidity that one hour is sufficient for the entire 200 birds.

chine; by then pressing down a lever, the piston forces the proper quantities of food into the fowl's crop. A graduated dial regulates the quantity given, according to the age, stage of fattening of each bird. The operator push with the hand causes the frame to revolve so as to bring the next bird opposite the feeder, and the feeding is thus pushed with such rapidity that one hour is sufficient for the entire 200 birds.

PREPARATION OF FOWLS FOR CONSUMPTION.

Poultry should be plucked or picked still warm, when the feathers will be removed with much less difficulty. Fowls are picked quite clean, but it looks better in the case of chickens to leave a few feathers about the tail. They will eat nothing further is done to them; but scalding improves the appearance greatly before plunging the carcase, immediately after plucking, into a vessel of boiling water for a few moments, which will "plump" them a great deal, and make the skin look clean. After scalding, turkeys and fowls should be hung by the neck in a waterfowl by the neck. For sale at market wholesale they should not be plucked as they will keep much better without this is the proper business of the plucker, but in selling for consumption the fowls should be properly prepared for sale. After drawing, the cavity may not be out of place to remove the entrails, after drawing, the cavity be filled with coal broken in small pieces, the fowls be kept sweet a considerable time. Fowls should, if possible, be hung in a cool place for a few days or a fortnight before cooking. The cooking may generally be done with the charcoal just mentioned. If the fowls are half-boiled, and the cooking finished in a hot oven, they will be found much more palatable than if the roasting process alone is employed.—From Wright's "Illustrated Cook" for June.

REARING TURKEYS.

ST season, says a correspondent of a trans-Atlantic contemporary, we tried an experiment in raising turkeys. In spring we bought a gobbler and four hens, from these we raised nearly one hundred young turkeys, by setting the early eggs from common fowls. Later in the spring, we allowed each turkey hen to produce a brood of her own. We practised placing three broods, of nearly the same age, under one hen, having in one flock thirty, in another nearly forty, &c. For the first four weeks we kept the young turkeys confined in a small space, crowded, and were very careful to keep them under shelter when it rained, and at night. We fed them mainly, at first, on the curd of sour milk, made by draining the milk and draining off the whey, so the curd was quite dry. With this we mixed about one-third its bulk of corn meal and feed each day, feeding the curd alone the remainder of the time. They were well supplied with water. When the young were about five weeks old, they received more liberty and had their liberty except at night in stormy weather. We found that at first, but especially while quite small, young turkeys needed their food very frequently, not less than five or six times

in the time our wheat harvest was over, when young birds were nearly half-grown and gathered, and I shewed them the way to the stubble, where they would eat their food and then return to their quarters. Later in the season, the grasshoppers became very numerous in the pasture fields, and on these the turkeys fared sumptuously every day until they lasted, which was until heavy rains came, late in the fall. With a little care, we trained our feathered herd so that no persons could drive a hundred or more of them where they would, as easily as a flock of sheep.

Early in the autumn I bought of a near

neighbour a few over 100 young turkeys. They were about half-grown when I got them, and the two flocks together made us out just 200. It began to look like being overrun with turkeys about this time—turkeys in the doorway, turkeys in the garden, turkeys in the corn-field, turkeys everywhere. As the grasshoppers, stubble fields, and other outside supplies began to fail, I had to increase the feed of our turkeys; and for two months I fed them 2 bushels of ears of corn each day. Corn was at that time worth about 25 cents per bushel of ears.

Early in December we commenced killing and marketing our earliest broods. The latest we kept till about the first of January. We killed them by hanging them up by the feet and opening the large veins in the throat with a small knife.

I sold to a dealer in Ionia who shipped them to New York. He paid me 10 cents per lb. All he required in the line of dressing was to have the feathers carefully taken off. The head, legs, and intestines went to market with the rest. Four persons, two women and two men, would kill and dress about sixty in a day. The gobblers averaged about 14 lb. each, and the hens about 8 lb. This may seem like small weight to the men who shew turkeys at the fairs weighing from 30 to 40 lb., but it is about as well as common turkeys will do at seven months old.

After my season's experience, I think that if I were near a good market where I could get the full value of my fowls myself, I could make a profitable business of raising poultry, and particularly turkeys. As it is, I think there is not profit enough to pay for the trouble and for being deprived of sweet corn, tomatoes, peas, and cucumbers, all of which they will surely eat up unless they are confined. We tried shutting in, but they will not bear confinement after they are four or five weeks old, without becoming sickly.

The Apiarian.

UNITING HIVES.

THE careful bee-keeper, in watching his hives in spring, will be very likely to find some that appear to be weak; but comparatively few bees seem to be flying about them, while the others seem to be swarming with bees. Now, the sooner those weak hives are united or strengthened the better. A hive weak in spring may, with a good honey season, become strong, but will store but little, if any, surplus honey, and if a swarm is thrown off it will probably be a late one. The golden rule for bee-keepers is—"keep your stocks strong." To do this requires a firm determination not to depend upon the number of hives, but upon their strength. In uniting hives, two facts connected with the instincts of the honey bee should be borne in mind. The first is, bees note the location of their hives, and if they are moved any distance within their range of flight, will return to their locality, instead of the hive. The second is, bees recognize each other by their scent.

Now, we learn from the first, that hives to be united must be near each other, or be brought near each other by moving 1 or 2 feet every pleasant day so as to accustom the bees to this change of locality. And

we learn from the second fact that if we wish to unite two colonies of bees and make them harmonious, we must give them the same

scent. This can be accomplished by sprinkling the bees in both hives with sweetened water scented with pepper-mint, and then uniting, or by smoking with tobacco. The latter is the most expeditious.

Where there are no permanent bottom boards to the hives, one hive can be set on the top of the other as mentioned above, without the wire cloth, and then smoked. In uniting hives with permanent bottom boards, by having a box or hive for the purpose without a bottom, the frames and bees of one of the hives can be changed to it, and this placed on the top of the other.

Where there is any choice of queens in the hives to be united, the least desirable queen should be taken from the hive before uniting, to secure the safety of the other. All uniting of bees should be done towards

Practical Farmer.

EXPERIENCE WITH BEES.

R JAMES MAITLAND, writing to the *Toronto Globe*, says :—

past season has been one of the most irritable I ever experienced for the bees in this section of the country (knock). Many old stocks will not through, and many young ones will all worse.

of my neighbours smothered eleven of black bees last fall. He obtained 10 lb. of honey altogether. The bees common box hives. No doubt, you know, as I do, what a waste has taken place so much on account of the bees in combs ; for had the frame hives been in the empty combs could have come into this season, by being properly cared for, the loss of last season would thus be avoided.

managed to Italianize all my stocks, or 10, from one queen bee. I had forty-combs last fall, which I had weighed ; of which not coming up to the required weight to winter through properly, I made up heavy stocks from them, by simply every two together, first taking away the queen. I use frame hives altogether, as many things can be done with which it is impossible to do with any kind of hive. I have nearly enough combs to fill ten hives for this season's needs saved from those I doubled up, will enable me to take advantage of every season.

Italian bees still maintain their reputation.

I think they make about one-third more honey than the black or common bees. I have practised artificial impregnation with a good deal of success. I fully believe in the system ; but still, once in a while there is a failure. I will give one trial to the system turning out all right. In the place I placed a young Italian queen, newly introduced into the impregnating box along

with some workers, where they remained until the fifth day, when I removed the working bees, putting in their stead six or seven pure drones, which I left thirty-six hours. At the end of that time I took out the young queen, and took her about 5 miles from here, where no other but black bees are kept, and introduced her into a black stock. Now for the result : In the month of October, 1871, I visited the locality and examined the bees. I found that the hive in question had swarmed naturally, throwing off as beautiful a stock of pure Italian bees as I have among my own ; also the young queen in the old hive was producing pure bees likewise.

I am certain the young queen never flew before I took her away. I saw two drones lying dead at the end of thirty-six hours on the bottom of the box.

I intend to experiment still further with the queens next year. It may be that we do not allow the queen to be old enough before putting in the drones. If we were to adopt the eighth day of her age instead of the fifth, it might, I think, answer better. Time will tell.

I have not known any cases of foul brood in this part. Is the cause and origin of the disease clearly known ? I would like to guard against it in every possible shape. A timely hint would confer a favour on bee-keepers in general. Before closing, I would ask you the best mode to adopt in order to renew an old hive of bees and comb. Two years ago, I adopted the plan of putting one hive under another. I succeeded in getting the under hive filled with combs and honey. The top hive I removed, which contained a fine lot of honey, and wintered the bees in the under one ; but upon examining the combs this year I found there was too much drone or store comb, and had I not put in proper brood comb, the hive would not have been of much use to any one.

The Naturalist.

SALMON AND TROUT BREEDING.

WRITING in *Land and Water*, Mr Frank Buckland says :—

The fish breeding season is now considerably advanced, and "turning out time" has arrived. The salmon, trout, charr, &c., hatched out in my museum, have now quite absorbed their umbilical bags, and have been feeding for the last fortnight. Moreover, they are beginning to die in their troughs. This is a certain test that they require thinning and feeding. I have therefore sent several thousand fish to my friend Ponder, who has placed them in the nursery, close to Sunbury lock, the use of which has been so kindly afforded to Mr Ponder and myself by the Thames Conservancy Board. These fish will eventually be turned out into the Thames.

For my own part I am trying a new experiment. I have taken all the minnows away out of my two lower tanks, where the water is about a foot deep, and have transferred the trout and charr to one compartment, the salmon to another, and the Coquet bull trout to a third, and there they can be seen as thick as tadpoles. These fish are as yet very tiny little things, but they are growing fast in their new places of abode. The little salmon have already begun to grow up, and the trout and charr are beginning to show their heads above water. I have also sent a few of the minnows to Mr Ponder, who has placed them in the nursery, close to Sunbury lock, the use of which has been so kindly afforded to Mr Ponder and myself by the Thames Conservancy Board. These fish will eventually be turned out into the Thames.

them into too large places ; anyhow we now see whether my doctrine be correct—that when their umbilical bags are quite absorbed, the fish should be transferred to a tank—not an out-of-door stream—my tank made of zinc, about 8 feet long and 4 feet wide, and "hand-fed" for at least another month or six weeks. Mr Edon, the attendant, observed that the little fish will feed as provender falls towards the bottom, and they leave it alone. If, however, they are stirred, they will run to the place where the provender is, and pick up the little bits. I also give the fish plenty of live worms, *i.e.*, the worms that give the colour to the mud on the banks of the Thames. These worms are always wriggling about, and attract the notice of the fish. Moreover, they are kind enough, apparently, not to mind being eaten up a bit at a time. The charr sent me by Mr Parnaby have been exceedingly well, and I propose to send a few of them to Windsor for the Obelisk Lake, the Windsor Great Park. The few charr that survived out of the lot sent by Mr J. J. of Christiana, have also done well, but I am sorry to say that the "landlocked" trout, and white fish from America, sent me by Mr Parnaby, have come to a bad end—they hatched out and then died.

I am more and more convinced that the indoor system of breeding is far more successful than the out-door system. The Duke of Sutherland has adopted it, and Mr J. J. has undertaken the management, and has got a good crop of fish this year. The Secretary, Mr Wright, has been good enough to send me the following report :—Our salmon look in first rate order ; scarcely a single one has died. I examined all the breeding-

peatedly the week we were there, and I did not get a dozen altogether dead. We turned a few thousand out into an artificial pond we have made, and the remainder will be moved this week. There were two boxes without any gravel at all, nothing but the plain wood; into these a quantity of ova were placed, which it was thought was not properly impregnated, but rather than throw it away, it was put into these troughs, and, singularly enough, it turned out better than all the rest, more fish hatched out, and they did better on the plain wood, or at least quite as well as those on the gravel." I have also received a letter from Lord Abinger's keeper, in which he reports to his lordship that the fish breed in slate troughs—not out of doors—for the Spean are doing very well. Mr J. Napier reports advance in the operations carried out by the Forth Fishery

Board at Loch Vennacher, so that we have now three places at least in Scotland where salmon breeding is going on. I hope in time that every district board will have its breeding establishment in England, Wales, and Scotland, for really the slate trough system is so inexpensive, and so easily managed, that I have great hopes to see its adoption much more universal than it is at present. As regards breeding trout which do not go to the sea, there can be no doubt but that many hitherto barren lakes, streams, reservoirs, &c., can be readily stocked. I can't bear to see water without fish in it; besides which, live and healthy fish mean pure water, and pure water means improved public health. I hear that a Mr Smith, of Groby, near Leicester, has had great success this year with the fish he has bred for the Earl of Stamford and Warrington.

The Country Gentlewoman.

FERNS FOR DRAWING-ROOM DECORATION.

A FEW years ago, when the popular taste for these gems of the vegetable world increased, somewhat suddenly, to almost a mania, it was prognosticated by many of the olden school who could see no beauty in any plant which did not produce a gaudy flower, that it was only a freak of fashion, and that it would not be long ere the fickle goddess would taboo them entirely, and we should hear no more of the beauties of Ferns. Happily, however, time has proved these would-be-prophets wrong; for although the great excitement in the public mind respecting Ferns has subsided, they have, nevertheless, gained a firm hold upon the hearts of all lovers of the beautiful in Nature, even as the wild idealism of a boyish love, which settles down with the man into a steadfast, true, and life-long joy.

The love for the various forms of Ferns has not been confined to those in possession of plant-houses and gardens, nor to either sex of amateurs, and thus the Wardian case has been brought to aid the dwellers in towns and cities to enable these charming plants to be enjoyed even in the midst of our busiest and most crowded thoroughfares.

It is not my purpose to enlarge upon the advantages of the Wardian case when properly managed, but to endeavour to alleviate a want which many of my fair friends have expressed to me, and which may at the same time be found worthy the attention of some of the readers of this Magazine who may be similarly situated. Many of my lady friends complain somewhat in this way:—"We have a Wardian case in which our Ferns thrive admirably, but we should like to distribute them about in various parts of our drawing-room and boudoir, but they are

not sufficiently robust to withstand the atmosphere of the rooms when uncovered, and as we cannot tolerate glass shades in places which we desire to beautify with and graceful foliage, we are unable to enjoy these plants to the extent those fortunate individuals can who have houses in which to arrange their collections. To those of my fair readers similarly situated I would beg the honour of being allowed to contribute to their happiness, by assuring them that it is quite possible to use Ferns for the decoration of apartments without jury, and also without the objectionable and heavy appearance which too many shades produce in any room—that is, by providing a proper selection of sorts made.

In order to enable Fern lovers, then, to choose both wisely and well, I append a brief descriptive list of kinds which may be grown under the somewhat unnatural conditions of indoor life.

Adiantum cuneatum.—This species is extensively grown, both for the purpose of cutting the fronds for bouquet-making, and for the decoration of ladies' hair for evening parties, and also as a Wardian case plant. It is not, however, so generally known as it produces an exquisite and pleasing effect when used in the drawing-room without covering. The beautiful dark green ovate-shaped pinnæ or leaves are supported by slender jet-black stems, and form a graceful whole, rendering this species a Maiden-hair Fern perhaps the most beautiful of its race. In addition to this, its constitution should recommend it to the notice of all who desire a charming plant.

A. affine, a more robust growing

previously named kind, and very large; it has deep green tripartite evergreen fronds, which are very persistent. It may be used, with great effect, for wreaths, or for bouquet-making.

Adiantum.—In this plant we have a real gem; it is somewhat strong-growing, reaching a height of from 2 to 3 feet; the root-stalks, are jet black, supporting a shining frond of bright shining green.

This plant is easily grown, and most effective.

Adiantum, sometimes called *A. pubescens*, is a plant which forms a handsome bushy tuft, about 18 inches or more in height; the fronds are flabellate and dark green, clothed with numerous short stiff hairs.

Adiantum Phyllitidis.—This is a very interesting plant. It produces shining fronds, the pinnæ being broad, ending in shining green. In addition to this, the plant arrives at a fertile state it produces little spikes of sori, which stand out and give it much the appearance of a fern.

Adiantum bulbiferum.—An interesting plant with light green arching fronds, which are laden with quantities of young plants, which grow from little bulbules from the underside.

Adiantum flaccidum.—This forms a charming subject when placed upon an ornamental pedestal on the top of a small pedestal; its pendulous fronds are somewhat thick and leathery in texture, and sometimes reach a considerable length.

Adiantum compressum.—A broad-leaved and robust plant, growing erect, and attaining a height of about 2 feet; the fronds are pinna-like in texture, dark green, and the fronds frequently bear young plants upon the upper surface.

Adiantum.—This plant, perhaps better known by the name of *A. diversifolium*, is an old favourite of mine. The fronds are broad and spreading, the barren ones bearing shining green pinnæ, whilst the fertile fronds are more finely divided; the two forms produced at the same time give it a striking effect.

A. marinum.—This is the Sea Spleenwort of our own islands; the fronds are erect and pinnate, the pinnæ are thick and leathery, and of the most vivid dark shining green; it is a charming plant.

A. lucidum.—A charming bold growing plant, with pendulous pinnate fronds, some 3 or 4 feet long; the pinnæ are leathery, oblong, and dark green; for the top of a column it is most effective.

A. præmorsum.—This is another plant with a somewhat pendulous habit; the fronds are bipinnate, and the pinnæ are peculiarly notched at the edges, and dark green; it is very distinct and handsome.

Blechnum occidentale.—Several species of this genus, I have no doubt, would be found to succeed in the drawing-room uncovered; but this is the only kind I can speak confidently of; it is a charming plant for an ornamental vase; the fronds are pinnate and rich bright green, usually growing from 12 to 18 inches high.

Cyrtomium caryotidicum.—An elegant and robust plant, growing from 1 to 2 feet high, spreading in habit, fronds pinnate, pinnæ large, pale green in colour.

C. Fortunei.—This differs from the last named plant in its more erect habit, smaller pinnæ, and the dark green of its fronds; it is extremely ornamental.

Davallia canariensis.—The present plant is popularly known as the Hare's-foot Fern; the peculiar stout creeping rhizome, clothed with light brown chaffy scales, producing a striking resemblance to the foot of a hare; it produces broad much-divided fronds, which are dark green, whilst the sori, which are freely produced and reddish-brown in colour, adds materially to its beauty.

D. tenuifolia.—This plant does not belong to the Hare's-foot section of the genus, and is perhaps more correctly known as *Odontosoria tenuifolia*; it is an erect growing plant, varying from 1 to 3 feet in height; the fronds are finely divided, oblong-lanceolate in shape, and very deep green in colour; undoubtedly one of the most elegant Ferns for room decoration.

Dicksonia antarctica.—Although this is one of our most robust Tree Ferns, it nevertheless makes a beautiful plant for the purpose

here recommended ; its fronds are broad and spreading, the upper side being dark bright green.

Doodia aspera.—Fronds erect, broadest in the centre, tapering somewhat at each end, intense deep green, and about 1 foot high when well-grown.

D. blechnoides.—This fine species varies from 12 to 18 inches in length of fronds, which are broad, pinnatifid, and very deep green in colour.

Lastrea glabella.—An elegant little plant, and very hardy ; it forms a beautiful little tuft, the fronds being finely divided, some 10 inches high, and bright green.

L. decomposita.—This is a most useful plant for the purpose of decoration ; the fronds are all decompound, upwards of 1 foot long, and of a rich dark-green colour.

L. hirtipes.—Fronds upwards of 18 inches long, pinnate, and deep green ; the pinnæ are large, and the stipes are furnished with large dark chaffy scales. It is a remarkably fine and ornamental plant.

Litobrochia vespertilionis.—A beautiful and distinct Fern, producing large bipinnate fronds ; the pinnules are sessile, obtusely lobed, bright green above, glaucous below, the bright marginal sori adding much to its beauty.

L. macilenta.—This plant is not sufficiently appreciated by Fern growers, for its fronds last a long time when cut and placed in water, independent of its beauty for in-door decoration ; its fronds vary from 1 to upwards of 3 feet in height ; the pinnules are broad, serrated at the edges, and bright green.

Lomaria gibba.—The present plant forms a beautiful vase-like object, and cannot be too strongly recommended ; the plant forms a slender stem, which adds materially to the general effect ; fronds from 1 to 2 feet long, pinnatifid, and vivid green in colour.

L. ciliata.—In this plant we have a perfect miniature Tree Fern ; the stem is very slender, and supports a small head of pinnatifid light green fronds ; the edges of the pinnæ are very blunt, and fringed with numerous hair-like teeth.

L. discolor.—A fine noble growing kind ; the stem is somewhat stout, fronds from 1 to 2 feet high, pinnatifid, dark green above, paler below ; in the fertile fronds the pinnæ are contracted, and wholly covered with the sori.

L. nuda.—This is somewhat like *L. gibba* in habit of growth ; fronds pinnatifid, from 1 to 2 feet long, dark green above, paler below the pinnæ, and somewhat leathery in texture, and admirably adapted for room decoration.

Nephrolepis exaltata, a common Fern, yet a very useful and highly ornamental plant ; the fronds vary from 1 to 3 feet in length, pinnate, linear lanceolate, and bright light green.

Platycerium alcicorne.—The Elk's Horn Fern, a remarkable plant, and one that is very effective as a basket or bracket plant ; the sterile fronds, or shields, are roundish, the feeble ones stipitate and forked at the upper edge, having somewhat the appearance of a stag's horn ; they are very leathery in texture, and clothed with curious stellate scales.

Platyloma rotundifolia.—A thoroughly distinct plant, and a very handsome one ; fronds pinnate, spreading, and about 18 inches long, pinnæ nearly round, and of an intense deep green.

Pleopeltis Billardieri.—Fronds simple when young, but pinnatifid when older, very leathery in texture, erect, and upwards of 1 foot in length ; the sori are large, and add materially to the beauty of the plant, raising little bosses (umbo) on the upper side of the fronds.

Polypodium drepanum.—A robust growing plant, producing stout broad bipinnate dark green fronds ; the under side is beautifully relieved by the dark black and large sori.

Polystichum denticulatum.—This is a superb plant ; the outline of the fronds is triangular, very finely divided, and attains a height of about 15 inches.

P. falcinellum.—A distinct and handsome plant with pinnate fronds, which are usually about 18 inches high.

P. proliferum.—This is a fine species, growing upwards of 2 feet high ; the fronds

e bipinnate, and bear young plants upon the ends, spreading, and dark green, the footstalks being clothed with large dark chaffy scales.

P. coriaceum.—Fronds tripinnate, about 3 feet in length, the pinnæ leathery in texture, and dark green; the fronds are spreading and gracefully arched, forming a noble ornament where space can be afforded it.

P. vestitum.—This is a fine plant, having bipinnate fronds some 18 inches long, the pinnæ being of a rich bright green, whilst the rachis and stipes are densely clothed with large chaffy scales.

Pteris hastata.—This very fine plant is remarkable for its vivid dark green hastate pinnæ and black stipes, which give it more the appearance of a Maiden-hair than a *Pteris*; the fronds are bipinnate, and grow some 2 feet long. This plant should find a place in every collection.

P. arguta.—A plant of robust habit, growing some 4 feet high; fronds pinnate, the pinnæ being pinnatifid; the fine light green of the fronds is very cheering, and where space can be afforded, it will form a grand object.

P. cretica.—This plant has pinnate fronds, about 1 foot in height; the pinnæ are long and bright green.

P. cretica albo-lineata.—A variety of the preceding, with darker green fronds, and, in addition, ornamented with a band of white, which occupies the centre of each pinnæ.

P. longifolia.—An old garden plant, and very ornamental; the fronds are erect, pinnate, some 18 inches high, and dark green.

P. argyrea.—A grand and very effective plant; fronds broad and spreading, growing from 1 to upwards of 4 feet in length; the ground colour is of an intense metallic white, each pinnæ being beautifully margined with dark green.

P. serrulata.—A superb kind for the amateur, as it is so useful for bouquet-making in addition to its ornamental appearance when used for in-door decoration; the fronds are pinnate and spreading, pinnæ long, linear, pendulous, and light green.

P. serrulata cristata.—This resembles the preceding, but has a beautiful curled crest upon the end of each pinnæ.

P. tremula.—A fine noble growing plant, somewhat resembling *P. arguta*, yet abundantly distinct, with broad spreading vivid green fronds.

Thamnopteris australasica.—This is the Australian Bird-nest Fern, which must not be confounded with *T. nidus*, which is too often done; the fronds are erect, narrow at the base, widening upwards, entire and vivid green; it is a noble plant, deserving extensive cultivation.

Woodwardia radicans.—This noble Fern is perhaps the most effective plant for a large vase upon the top of a pedestal; the fronds are beautifully arched and pendulous, pinnæ broad, and rich deep green in colour.

Before quitting this subject, I would impress upon the minds of my readers the necessity of buying only those plants which are sufficiently large to be effective at once, for even under the best treatment the growth of plants when kept in the dwelling-house is very much slower than when they have the advantage of a plant house; and I have known much disappointment accrue from the use of small things that required to be well grown up before they can become effective. Ferns require an abundance of water at their roots, and when used in the dwelling-house they should be carefully tended to prevent them suffering from the arid atmosphere which pervades the dwelling apartments. This, and an occasional syringing, to remove any dust from the leaves, will be all the care necessary to keep them in good health, and enable them to cheer the heart of all beholders with their elegant and graceful crown of leaves.

It must not be supposed that we consider it essential to use the whole of the kinds named here; but as tastes differ, even in the love of Ferns, the descriptions will enable each person to gratify themselves, and to select only those which are the most beautiful, according to their own peculiar views and requirements.—*Vive Vale*.

LIQUID MANURE FOR HOUSE PLANTS.

AS liquid manure cannot always be had, especially in winter, dirty suds in which clothing has been washed, I find, will answer as well. I have been using it once a-week all winter, and my plants never grew so fast or looked so well. I have a double Primrose, in a 3-inch pot, on which I can count over one hundred blossoms : also some bicolor and white Geraniums, started for spring planting, only 3 inches high, the leaves measuring 4 inches in diameter. My largest Calla stands 3 feet 2 inches high, leaves 15 inches ; also many other things, all of which I attribute to

the use of my dirty suds once a-week during winter.

Last summer I watered all my Roses with it, and the pillar Roses with dish-water. The slugs scarcely troubled them, and the blossoms were really wonderful, both in quality and quantity. I never have any slops wasted. Bedroom slops are just the kind to throw around the roots of young trees. I think that is what saved our Mountain Ash last year from the borers ; at any rate it never does any harm to save all the slops for Grape vines and hardy trees.—*Mrs S. J. H.*

THE COUNTRY GENTLEMAN'S MAGAZINE

AUGUST 1872

IRISH ABSENTEEISM—PAST AND PRESENT.

CH light has been thrown upon the distribution of landed property in Ireland, and the prevalence of absenteeism, when issued during the present session, in the motion of Mr Patrick Smyth. Mr Smith (says the *Times*) gives the landed proprietors in each province and county of Ireland, classified according to residence, and the extent and value of the property in each class. It was prepared in 1870, when the Irish Government collected evidence on every branch of the question, and was based on the returns of 1869. It cannot, therefore, be taken as more than approximately correct for the present year, and it does not include owners of lands and towns, but only proprietors in the urban or rural districts. Within these, however, the particulars of residence are regarded as highly trustworthy, having been obtained by the Irish Poor Law Inspectors, through personal inquiries from the ratepayers, unions, poor-rate collectors, "and persons possessing local knowledge of the district." In this respect it is probably the most accurate, as it is certainly the most complete, to any similar document hitherto compiled. So far back as the first list of Irish absentees was published, in 1800, the yearly value of their estates and the number spent abroad; other lists of the same kind appeared subsequently, and one was published in the admirable treatise of Mr Young. Indeed, the evils of absenteeism

OL. IX.

had engaged the attention of thoughtful men in Ireland at a still earlier period, having been extenuated rather sophistically by Sir William Petty, and depicted in the darkest colours by Dean Swift, who asserts more than once that a full third of the rental of Ireland was transmitted to landlords permanently resident in England, besides vast sums carried out of the country by other Irishmen of the upper classes. All these estimates must be considered loose and unsatisfactory as compared with such a Return as that before us, inasmuch as they are, at best, founded on private information, and not on official authority. At the same time, they coincide so nearly in their general results as to be of considerable value in enabling us to appreciate the present statistics of Irish proprietorship and absenteeism.

It appears that the soil of Ireland, exclusive of town sites, is divided among 19,547 proprietors, holding in fee-simple, in "perpetuity," or "on long leases at chief-rents." Since it covers an area just exceeding 20,000,000 statute acres, we may say, roughly, that Irish properties average 1000 acres in size. Of these 19,547 proprietors, 5589, owning properties of 100 acres and upwards, are ascertained to be resident on or near their estates. There are also 4465 proprietors of 100 acres and upwards who reside constantly elsewhere in Ireland, besides 377 who usually reside elsewhere in Ireland, but occasionally on the estate. Only 180 are returned as "resident usually out of

Ireland, but occasionally on the property," though we are not surprised to find that while these 180 constitute less than one-hundredth part of the Irish proprietary, they own between them nearly one-fifteenth part of the whole acreage. Those "rarely or never resident in Ireland" are stated at 1443—that is, between one-thirteenth and one-fourteenth of the whole number—but own together between one-sixth and one-seventh of the whole acreage. More than 500,000 acres belonging to 161 "public or charitable institutions or public companies," a somewhat larger amount to owners "not ascertained," and nearly 500,000 to "proprietors of properties under 100 acres, unclassified." These small "unclassified" properties are nearly 6000 in number, but as very few of them, we may be sure, reside out of Ireland, the proportion of *bona fide* absentees to *bona fide* resident owners would be scarcely affected if they were included in the calculation. Comparing these two classes with each other, we are gratified to find that constant residents are nearly four times as numerous as constant absentees, while they own very nearly thrice as much property in area and above thrice as much in value. But this fact by no means represents the real preponderance of proprietors resident in Ireland over absentees properly so called. There remains to be added, for this purpose, the large class of Irish proprietors who do not live, indeed, on their properties, but in Dublin or elsewhere in Ireland, falling short of the *bona fide* residents by one-fifth only in number, and owning nearly half as much land in area and value. If these be taken into the account, and if Swift's computation be accepted as fairly accurate for his own time, we must needs infer that a vast abatement has taken place in the evil of Irish absenteeism. Instead of one-third of the Irish rental going directly into the pockets of "perpetual absentees," never to come back in any shape, it is here clearly shewn that little more than one-seventh is thus absorbed, of which it is certain that a very large part is sent back to Ireland to be spent in improvements and otherwise for

the benefit of the country. Even if absentees who occasionally reside and public corporations be thrown into the same category, absentees cannot be made accountable for so much as a-quarter of the Irish rental, and no one who knows Ireland will deny that among the former, at all events, are some of her best landlords and greatest benefactors.

We may, then, conclude with some confidence that Irish absenteeism has not increased, but, on the contrary, has rather diminished, since the Union. There is reason to believe that, on the whole, the Encumbered and Landed Estates Courts have promoted the substitution of resident for non-resident proprietors. Whether the Land Act will have the same tendency, by encouraging tenant-farmers to bid for estates on sale, or will have the opposite tendency, by weakening a landlord's motives for residing on his property, it is as yet impossible to foresee. However this may be, what cannot be denied, and ought not to be forgotten, is that absenteeism, if it is not so enormous and crying an evil as in the last century, is still, as it has ever been, one of the main obstacles to the prosperity of Ireland. In Great Britain, and especially in Scotland, where it has become much too common, its evil effects are mitigated by the independent spirit of the people. In Ireland there is nothing to supply the place of a resident landlord's example and influence, yet, by a strange fatality, the very circumstances which make this so necessary to the island are the immediate cause of absenteeism. Berkeley asks, in his pregnant style, "whether a gentleman who hath seen a little of the world and observed how men live elsewhere can contentedly sit down in a cold, damp, sordid habitation in the midst of a bleak country inhabited by thieves and beggars." After making due allowance for a marked advance in Irish civilization since Berkeley's age, which, however, is partly compensated by a corresponding advance in the Irish squire's notions of comfort, this question of Berkeley's might be put with equal propriety at the present day. The simple reason why so many Irish proprietors reside in England or on the Continent is that life is there

preceable, more stirring, and, we must
ore secure. In the early part of
III.'s reign it was actually proposed
Government to counteract the force
gravitation eastward by levying a tax
in the £ on the net income of
landlords who should not reside half
in the island. No one would now
to revive such a proposal, and it is
an doubtful whether the peasant
on a property like that of Lord Fitz-
or Lord Devon would gain by the
sale of it to a Dublin land-jobber,
non-resident, but far less generous and
it. There is, in fact, no heroic or
y remedy for absenteeism, and though
Rule might induce some English
en to sell their Irish estates, it could
pel the new purchasers to reside upon
to abstain from putting them, after
mer of old Irish families, into the
f middlemen. The agrarian outrages
ave so long disgraced Westmeath, and
ical terrorism recently exercised by
d mobs in Galway, exemplify the

the causes which swell the number of pro-
prietors "rarely or never resident in Ireland."
After the Galway election, a Roman Catholic
gentleman of antient Irish lineage, whose life
had been threatened, signified his intention of
leaving the county, and who can blame him
if he carries out his resolve? Yet his de-
parture will close one hospitable mansion,
and thereby render the neighbourhood less
attractive to others, besides involving a
direct loss of employment and custom.
Those who aspire to guide popular opinion
in Ireland will do well to reflect on such
considerations as these. Of course, it is pos-
sible that Ireland is destined to become a
community of small proprietors, with a ro-
landed aristocracy and few capitalist manu-
facturers. In that case, it will probably ex-
hibit the nearest approach yet realized to
what economists call "the stationary state."
In any other case, a resident gentry may be
of the utmost service in the social regenera-
tion of Ireland, and no Irishman deserves
well of his country who seeks to make the
position of a resident gentry less enviable.

THE IRISH LAND ACT AND THE LORDS' COMMITTEE.

3 tenant-farmers of Ulster are begin-
ning to express themselves in very
rms in reference to the Lords' Com-
on the Land Act. At the quarter
held lately for the Newtownards
of County Down, the grand jury pre-
in address to the chairman of the
Mr Robert Johnston, Q.C., in which,
referred to the able and impartial
in which he had administered the
elation to the Land Act, they said,
nsider it necessary to give this ex-
of our confidence in the efficiency
ibunals under which the provisions
Act are carried out, especially at a
nen a Committee of the House of
engaged in holding an inquiry on
ring of this Act of Parliament before

it has been two years in operation. We
should learn with regret that any change was
contemplated in the working of an Act which
we consider one of the most important passed
for Ireland during many generations." His
worship, in concluding his reply, said he was
satisfied that when the Act came to be better
known, litigation would cease, and disputes
be settled out of court.

A meeting of the Down Tenant-Farmers'
Union was held also in Downpatrick, at
which resolutions were passed stating that
the Irish Land Act has been found to work
with great satisfaction during the year and
ten months in which it has been in operation,
and notwithstanding the number of judges
concerned in administering its provisions, the
decisions have been wonderfully uniform. The

meeting would therefore view with great concern any attempt to unsettle the relations of landlord and tenant, and earnestly trust that the wisdom of statesmen will prevent such a course. It was further set forth that the report of the Committee of the Lords now sitting to inquire into the working of the Act cannot be received with public satisfaction, inasmuch as no invitation had been sent to any tenant-farmers' association to express their opinion or to send witnesses before the Committee to give evidence on a measure which has already proved of vital importance to farmers. Captain M'Ghie seconded the resolution, which was unanimously adopted. A Tenants' Defence Association meeting in Ballinmoney, county Antrim, has passed a long series of resolutions, in which they strongly protest against the House of Lords holding a secret inquiry into the workings of the Irish Land Act; first, because the time

selected is premature and inopportune, the capabilities of the Act not having received a sufficiently lengthened test to warrant interference with its operation. Secondly, that without recognizing it as a final settlement of the question, they record their conviction that it has already produced a salutary change in the relations between landlord and tenant, more particularly in Ulster, where the enhanced value of tenant-right in consequence of its legislation has not only been a boon to the tenant, but the value of the fee-simple property of the landlord has also been increased. In proof of this they refer to the sale of the Waterford estate. Lastly, it is urged that the committee of the House of Lords should summon tenant-farmers to give evidence on the working of the Act if the inquiry is to be conducted on principles consonant with honour and justice, and not upon those which excite universal disapproval.

PROFESSOR ROGERS AND THE LAND LAWS.

THE *North of England Farmer* has the following article upon Professor Thorold Rogers's speech at Banbury. Professor Rogers wrote a book, that was published half a dozen years ago, regarding the history of agricultural prices, a valuable work no doubt, but about as interesting reading for farmers as a "ready reckoner," with the prices in Latin or Greek. Cultivators of the soil, as a rule, we are sorry to remark, do not keep a record of the values of their corn or stock. If they did, we should be able to give them satisfactory information in the following manner:—

What her motive

may have been for so doing, we have no conception. Perhaps she had lost a husband. Perhaps she never had one. Perhaps she wanted one. Whichever supposition is right, she was unquestionably a curious specimen of womankind. That may be the reason why Professor Thorold Rogers has gone down to the legendary town to discourse on his favourite theme. "Ride a cock-horse," in his journey, is perfectly inapplicable; and considering also that his hearers included amongst them a large number of agricultural labourers, we need not be surprised that his speech was prodigiously applauded. For, just consider for a moment what the ex-Professor of Political Economy had in hand. He went down to Banbury to represent the cause of the Land Tenure Reform Association, the objects of which formidable body are to remove all legal and fiscal impediments to the transfer of land; to secure the abolition of the law of

rimogeniture ; to restrict within the narrowest limits the power of tying up land ; to claim, for the benefit of the State, the interception by taxation of the future unearned increase or rent of land ; to promote a policy of encouragement to co-operative agriculture through the purchase by the State from time to time, of estates which are in the market ; to promote the acquisition of land in a similar manner, to be let to small cultivators ; all lands now waste, or requiring an Act of Parliament to authorize their enclosure, to be retained for national uses ; that while it is expedient to bring a large portion of the present waste lands under cultivation for the above purposes, it is desirable that the less fertile portions, especially those within the reach of populous districts, should be retained in a state of wild natural beauty, for the general enjoyment of the community ; to obtain for the State the power to take possession, with a view to their preservation, of all natural objects or artificial constructions attached to the soil, which are of historical, scientific or artistic interest.

If our readers have not lost their breath, after scanning and trying to understand this tremendous programme of the Land Tenure Reform Association, their lungs must be made of bellows leather. A more revolutionary scheme it would be impossible to conceive, except in a revolutionary hot-bed. It is simply coming back to a redivision of the soil ; and, as the land of this country, and of every other country, is the basis of stability, we are invited to have a fresh start in wealth,—in which, of course, the race shall not be to the strong and the able. We are to have a paternal Government, which is to make a rough sub-division of the soil, because the soil belongs to the people ; and, that being so, the people will all turn farmers, and be merry ! There is one small difficulty in realizing this millennium. The State of course is omnipotent ; but, then, who makes or constitutes the State ? If we all become gentlemen farmers, then we must form the State. We cannot in that case very well look after ploughing, seeding, mowing, and harvesting, considering especially that we are all to be

landed proprietors. How delightful it would be to come down from the State on to a hay-mow !

Professor Rogers lets us see this sweet position. In speaking in support of the programme which we have given, he says that “if anything could bring about a serious fundamental change in the condition of this country, that change would be in consequence of the system of land laws under which this country lived and worked.” Seeing that this country is somewhat prosperous, we cannot quite see that any fundamental change is needed. The Professor, over and over again, tells the descendants of the old dame of Banbury that he will prove all this ; but, then, he turns to Sir Wilfrid Lawson’s Permissive Bill (which he condemns), and next enters into the history of England from the Conquest. “Land,” he says, which is “a valuable instrument, ought to be sold as free as any other article, in order that it might be easily and conveniently acquired by those who wish to purchase it.” Surely those who desire to buy land can do so, though not with the same facility as they could buy a bit of cheese. There are such things as titles and boundaries to be looked after ; and there is that little distinction that the land is always there, and can’t be eaten, though there is always plenty to be bought by those who have the power and the will to buy it. There is, therefore, no difficulty in agreeing with Professor Rogers, “that it is almost impossible for a poor man to get possession of land at all,”—except that it is impossible altogether, and not merely almost, for a poor man to buy land any more than he should buy a ship or a coal mine. “Some of the landowners,” says the Professor, “are up to their ears in debt.” Is this a specially exceptional position to be in ? If the land laws of the country are to be blamed for this assinine predicament, what shall be said of the commercial laws ? “Go to the hotel in any town, and the landlord will tell you that the county gentlemen are not worth 20s. a-year to him. They put their horses in the stable, and go and buy a twopenny bun.” Oh ! county gentlemen ! If you buy buns at all, why don’t you go

Robotham calculated about 16,000,000 acres of land to be overrun with an excess of game to the extent of one hare or one rabbit to the acre, and he contended that one for every 4 acres was a fair quantity for sporting purposes. There was, therefore, an excess of 12,000,000 hares and rabbits, taking them in equal quantities. The hares would represent the value of £900,000, and the rabbits £300,000, or a total value of £1,200,000; but remembering that two hares and two rabbits consumed as much as a sheep, they could keep in their place no less than 1,000,000 more sheep than were kept at present. In twelve months a small sheep fed without artificial food would leave £2. Three million sheep at this price would realize £6,000,000 in place of £1,200,000, the value of hares and rabbits in excess. It was evident, therefore, that a loss was incurred annually, by the excessive preservation of ground game, of no less than £4,800,000 worth of food and wool for the people, which had to be sustained by the occupiers of land—an amount which is in excess of the value of all the cattle and sheep imported annually into this country. It was evident, then, that the annual cost of hares and rabbits kept on cultivated land was 10s. each. In addition to this there was the cost of preserving, keepers, watchers, dogs, powder, shot, &c., while the value of this costly article of food was 3s. per head for the one, and 1s. only for the other. It was not to be expected that a farmer, when he saw the depredations from game going on upon his farm, could have the spirit to purchase the quantity of manure for the land and cakes for his stock which were necessary for good farming, hence he would continue his tenancy with loss both to himself and his landlord, or else he must seriously contemplate leaving the farm, and it was by no means an easy matter to get away from a farm without pecuniary loss.

THE INJUSTICE TO THE TENANT OF OVER-PRESERVATION.

It sometimes happened, when a farm was taken tolerably clear of game, in a few years a new owner commenced to preserve game

to the injury of the tenant. What remedy under such circumstances had he? It might be said that if he did not like to stay, he was at liberty to leave. In many cases this was done after having laid out extra money without the chance of getting it back again. He might consent to continue his tenancy on the promise that orders were given to the keeper to kill the rabbits; but those were often the keeper's perquisite, and it would be against his own interest to destroy all the rabbits. In the meantime, the capital of the tenant was being reduced year by year, until, in many cases, the tenant scarcely dare think of leaving, for fear that he should have little to leave with, although he might ultimately be obliged to do so. Several cases of this character had come under his own observation, and where valuation or arbitration had been resorted to, he had never seen the farmer receive half compensation for his loss by game, &c.—a statement which could be borne out by practical valuers. The abuses and injustice traceable to the over preservation of ground game were almost endless. Keepers might profess to kill rats, &c., and perhaps they did when they found them; but they destroyed the destroyers of vermin, and shot or trapped the cats that killed the mice, and waged war against owls and hawks. Rats, where numerous, are very destructive in fields as well as in corn stacks and buildings, and it is next to impossible to keep them down without dogs and cats, which are very difficult to keep on game-preserved lands. Hares were very destructive to wheat, barley, and clovers in April and May. The blade which was eaten did not come to proper maturity, was later ripe, and smaller in the ear, thus causing the sample to be uneven. The hare also eats tracks through a wheat field when nearly matured, taking only one bite out of each stem. The ear, drooping down, was entirely wasted, and $\frac{1}{2}$ acre patches of apparent barrenness here and there testified to the destructive tendency of the hare. Those animals appeared to have a pleasure for waste, for the barren ground on such patches would be found strewn with stems, &c., which they had left

behind. This damage, however, could not well be seen without going over the land before reaping. Rabbits eat all before them near the woods, burrows, &c. The practical farmer knew the value of an early seed field. April and early in May was the most expensive time for the keeping of sheep until the seeds were a pasture, especially when all the roots were consumed, and if sheep had to be kept on dry food, they did not improve much, and it was very costly. He had seen a clover field so eaten by hares and rabbits that it was fully two weeks later than it otherwise would have been to turn the sheep into. He had known many acres of land sown with oats instead of wheat because of the ravages of hares in a wheat field. The hare will eat wheat in preference to oats, and this, in many instances, entailed great loss on the farmer. Another serious loss he might mention, arising out of the fact that they could not sow winter tares where much game was kept, unless they were particularly anxious to provide for the hares and rabbits a continual feast. Again, where ground game abounds, the farmer must have all the turnips off the land and piled before or early in December; for if there came a storm, he would witness the destruction which was made. This involved an extra expense, for the turnips must be well covered, and, in consequence of the scratching of rabbits and hares, must be examined almost daily in frosty weather. In his opinion the land did not grow so much barley where the swedes were pulled off so long a period before they were consumed on the land.

THE ELIMINATION OF HARES AND RABBIT FROM THE GAME-LIST.

The hare is an epicure, who just tastes, and then passes on, leaving the work of destruction either to other offenders or to decay. They heard of several instances where gentlemen shared the hares and rabbit with their tenantry, and had better partridgeing than before, the tenants being allowed to course the hares and trap the rabbits. The sons had no more right to take a hare or a rabbit without leave than a sheep or pig, and there were many more prosecutions against the stealers of game than of farming produce. The occupier of the land has no time to spare towards prosecuting the poacher, also towards keeping his wife and children, and he was imprisoned, as well as the gamekeepers and police who were now the principal targets of the poachers. In 1871, in England and Wales alone, the total number of persons prosecuted against game was 10,771. After stating that he should like to see any person killing hares, and the facts he had brought forward sufficed to show the enormous cost and evil of ground game in Great Britain, Mr Peacock recommended that hares and rabbits should be struck off the Game Bill altogether. He also urged the expression of a unanimous opinion on the subject by petition, that a favourable opportunity now presented itself for doing so. The fact that a committee of the House of Commons had been appointed to take evidence on the Game Bill, and that if the farmers did not take action for themselves, they could expect to be relieved.

LOCAL TAXATION.

Times, in a late number, gives the first of a series of articles on the subject of Local Taxation. It founds its information on the Blue Book just issued by Mr. Stansfeld's office. This brings down our knowledge of the subject to the year 1869-70. It appears that the present Returns, though collected under the authority of the Local Taxation Board, were collected by the same office. The account of the local rates is heretofore printed in the annual Blue Book represents in amount scarcely one-third of these fiscal burdens. The publication of us is preceded by a table in which are set up statistically the whole local taxes for England for one year. The table for the additional statistics thus far to account is set out at the foot of the page. By this means the reader is furnished with a ready access to the original returns. In co-ordinating the returns as far as possible, the anomalous dates to which the accounts run are sharply disclosed. The rate year terminates at Lady-day; the Poor-law rate year at Easter; the Local Management (Metropolis), the Town Improvements (Metropolis), the Local Board of Health, and the Poor-law Board years terminate on any day which precedes the month of June. A uniformity in the time of closing is exercised in respect to many of the other rates. The Poor-law rate year ends with Michaelmas. The Turnpike accounts are closed at Lady-day, and the accounts of the Turnpike Trusts on the 31st of October. The Metropolitan Police Accounts terminate yearly with the 31st of March, while the City of London Police close their annual statements with each year. The Poor-law accounts are, however, made up to Michaelmas. Hence it is quite impossible to get an annual return of local-taxation which shall cover for each tax a coincident period of twelve months. All we can do is to set out the annual table the returns which

are nearest to each other in matter of dates. This the present Blue Book has accomplished. It shews that the whole amount raised in England as local taxes for the year 1869-70 was, in round numbers, £21,275,000. Arranging the figures according to the incidence of the tax, we obtain the following complete synopsis of our local burdens for the latest period officially known:—

LOCAL TAXATION OF ENGLAND FOR ONE YEAR, 1869-1870.

| Rates, Tolls, Dues, and Duties. | Received from | | Total Receipts. |
|--|-------------------------|----------------------------------|-----------------|
| | Rates, Tolls, Dues, &c. | Others sources, including Loans. | |
| Levied on rateable property:— | | | |
| 1. Poor's Rates, excluding County, Borough, Police, and Burial Board Rates | £8,423,525 | * £470,404 | £8,893,929 |
| 2. County and Rural Police Rates | 1,558,390 | 909,422 | 2,467,812 |
| 3. Borough and Town Police Rates | 1,602,859 | 1,338,020 | 2,940,879 |
| 4. Metropolitan Police Rates | 534,428 | 335,208 | 869,636 |
| 5. City of London Police Rates | 45,310 | 21,178 | 66,488 |
| 6. Metropolitan Local Management Rates | 1,474,266 | 394,966 | 1,869,232 |
| 7. Town Improvement Rates | 724,851 | 770,324 | 1,495,175 |
| 8. Local Board of Health Rates | 1,834,583 | 1,509,879 | 3,344,462 |
| 9. Lighting and Watching Rates | 39,073 | 1,335 | 41,038 |
| 10. City of London Ward Rates | 4,906 | — | * 4,906 |
| 11. Highway Rates | 1,345,538 | 73,181 | 1,418,719 |
| 12. Sewers Rates | 42,728 | 4,638 | 47,366 |
| 13. Drainage and Embankment Rates | 157,746 | 21,460 | 179,206 |
| 14. Burial Board Rates | 180,552 | 38,544 | 219,096 |
| 15. Church Rates | 27,129 | 3,149 | 30,278 |
| Levied on traffic:— | | | |
| 16. Turnpike Tolls | 856,532 | 77,699 | 934,231 |
| 17. Harbour Dues | 1,412,681 | 643,601 | 2,056,282 |
| 18. Pilotage and Light Dues | 667,944 | 43,664 | 711,608 |
| 19. Market and Fair Dues | 54,786 | 15,540 | 70,326 |
| 20. Bridge and Ferry Tolls | 88,044 | 8,822 | 96,866 |
| Levied on consumable articles:— | | | |
| 21. Coal and Wine Duties (City of London) | 198,197 | — | 198,197 |
| Total | £21,274,698 | £6,681,034 | £27,955,732 |

* Poor's Rates.—Loans are not included among the receipts of this return.

With the municipal borough receipts from tolls, dues, and rents a part of the revenue

includes a sum in the municipal borough turns of £632,206 raised from rents, and dues, and therefore to be left out of account when it is a question of pressure rateable property. In a round sum, therefore, the aggregate levied upon real property was £17,370,000, and no more. These figures prove the local taxation in England to be so much under the rate stated by some persons, the rate of growth is decided. In Mr Ward's return of the local taxation of rateable property in 1868, the total was £16,729, hence, in two years there has been an increase of £641,000, or 4 per cent. (The comparison is made upon £17,370,000; borough dues, and rents were not included in 1868. About £500,000 of this is due to the increase of the Poor's-rate alone. The rateable property in 1868 was £100,627,000, the average rate in the £ was 3s. 4d. On comparing the proportion borne by rural with the amount borne by town unions was found the former paid 2s. 9¼d. and the latter 4s. in the £. In 1870, the rateable property had increased as well as the population, and in the same ratio nearly. The rateable value of that year was £104,420,000, the average rate in the £ it had to bear was also 3s. 4d. The returns of 1870 make no distinction between town and country, but they do not give reason to suppose the proportionate burden has not changed in any material degree.

The receipts, in addition to the tax on real property in this first section, amounted to £5,891,000, between £2,000,000 and £3,000,000 of which was raised by loan on the security of the property; and £878,000 (exclusive of payments for Fire Brigade and for auditors) came from the Imperial Exchequer. The receipts raised for Poor's-rate and for other purposes during the year are not included in the Blue Book. Those relating to the Poor's-rate are recorded amounting to £1,172,222; to aid borough and metropolitan local management, £162,350; town improvement, £17,722; local board rates, £1,003,000; sewer rates, £2600. The loans for the year of tolls and dues are stated for the

been—for turnpike trusts, £2675
 at for harbours, £371,684.
 It discussion invests the payments
 rough Parliamentary grants in aid of
 es with peculiar interest. It is con-
 hat local taxes are raised for many pur-
 hich are truly national concerns, and
 herefore should be met by the Im-
 urse.

easement of local taxes by Treasury
 ts only extends to those which fall
 al property. The total received by
 l authorities for the year under con-
 n was £888,000, thus distributed:—

| RY SUBSIDIES TO LOCAL RATES IN 1870. | | | |
|--------------------------------------|---------|----------|--|
| Poor's Rates. | | | |
| Schoolmasters and School- | | | |
| ses | £34,500 | | |
| Ecers | 110,000 | | |
| | | £144,500 | |
| Carry forward | | £144,500 | |

| | |
|--------------------------------------|----------|
| Brought forward | £144,500 |
| County Rates and Rural Police Rates. | |
| Prosecutions, &c., Prisoners | £218,724 |
| Police Subsidy | 148,650 |
| | 367,374 |
| Borough Rates and Town Police Rates. | |
| Prosecutions, &c., Prisoners | £67,752 |
| Police Subsidy | 101,644 |
| | 169,396 |
| Metropolitan Police Rates. | |
| Subsidy | 203,099 |
| To Fire Brigade | 10,000 |
| | 213,099 |
| Total | £888,399 |

In addition to this total must be placed
 the salaries of Poor Law Auditors, formerly
 paid by the Guardians, but now defrayed by
 the Treasury; and the Government subven-
 tion to the City of London on account of
 prisons and criminal prosecutions; the first-
 named payment amounting to £17,974; the
 second to £5700. Thus the grand total in
 aid of local taxation paid from the Imperial
 revenue was £911,000.

SING AND EDUCATION OF AGRICULTURAL LABOURERS.

By the Rev. W. S. MILLER.*

wished he could go into the subject
 with more enthusiasm than recent
 tances allowed him to do. The
 goodwill and sympathy with which he
 regard the labourers as a class had
 d a very rude shock. During the
 months the labourer's character had
 ry much in his estimation, and he was
 o add that in his judgment the
 r's prospects had very much deterio-
 There was no one in the rural dis-
 ho could not, within his own know-
 nd in his own village, point out the
 ce which existed in the condition of
 ural labourers residing in the same
 nd receiving the same wages. This
 ce was to be met with in all parts of
 ntry, and was apparent upon a cursory
 The reasons for the dissimilarity
 be found—first, in the difference in

the home circumstances of the people; and
 secondly, in the education they received.

THE COTTAGE ACCOMMODATION OF LABOURERS.

Amongst home circumstances the nature
 of the cottage accommodation was a promi-
 nent feature; there were many circumstances
 under which want of proper accommodation
 would suffice to produce the evils which they
 all had noticed. A bad cottage would go
 far to produce a bad home; at least it would
 hasten the work where there were other
 causes tending to that result. Bad cottages
 would more often produce self neglect than
 be themselves the offspring of self-neglect.
 A man who could take no pride or pleasure
 in his home soon became careless of him-
 self. Bad cottages not only deprived a man
 of spirit and energy, by making his home
 uncomfortable, but they affected his physical
 powers. They meant bad air; bad ai

d before the Midland Farmers' Club.

out her learning anything. He had objection to further knowledge, so that it interfere with more essential things; objected to her learning more if it led to the detriment of essential things. He would have a similar course with his husband.

SOCIAL STATUS OF THE LABOURER.

I thought there was much false sympathy shown for the labourer, and for his inability to raise himself in the social scale. The man could better himself if he would make the necessary sacrifices. Of course he could not without self-restraint and rigour, any more than any one else. It is well known, "What can a man do with 12s. a-week and four children?" But a man was never burdened with four children, and was not expected to live on 12s. a-week. There was a period when he had no wife or child; and a full-grown man always earn more than 12s. a-week if he would only make himself to earn more. If it were true that a labourer with a family could live on the ordinary rate of wages that must be allowed, because so he could do it without any evidence of pinch (and with apparent comfort), it was

evident that, without such hindrance, he could save something. It might be considered that twenty-five years of age was young enough for any man of prudence to marry. Then certainly for seven years previously a man might save 2s. a-week out of his wages. That was £5, 4s. a year, and in seven years it was £36, 8s., to which had to be added compound interest in the savings' bank, bringing it up to about £50. The woman might have put by half as much as the man, so that they would start with £75, from which £15 must be deducted for furniture. This would leave £60. Now, supposing from the time of their marriage nothing was added to this, yet, untouched, it would add to itself by way of interest. In about fifteen years it would have reached £120, so that by the time a man is forty years old he might have that sum. At sixty it would be £250, and that would buy the man a good annuity for the remainder of his life. Of course all this required self-denial and care, but these were necessary in any department of life. There was no reason why the labourer should not advance himself; and when he did not raise himself it was not from want of power, but want of will. When he degraded himself it was through abuse of his opportunities.

THE FARM SERVANTS IN THE NORTH OF SCOTLAND.

MENTIONING in a previous article (see vol. viii., page 343), on this subject, the condition and prospects of farm-servants in the northern counties of Scotland, from the first of the present century till about 1860, we purpose now to show that in the last ten or twelve years, during which there has been little change in the mode and usage of the agricultural labourer, the system of hiring has not been uniform, and there has been nothing approaching a standard mode of payment. For many years the majority of the servants have been engaged in the feeing markets; but

latterly, a considerable, and happily a growing number have been hired privately, either by personal interview or by means of registration offices.

By establishing institutions of this kind all over the country, many farmers and others have been taking steps to supersede the time-honoured feeing markets. To abolish these half-yearly assemblies, however, a considerable length of time, and more uniformity of action, will be required. Without attempting a defence of the feeing market, we hope to show that this is not the most essential reform for the benefit of the farm-servant.

The majority of farmers, and (influenced by recent expectations of acquiring holidays otherwise) a large number of the *employés* desire the discontinuance of the periodical hiring fairs; but no inconsiderable, though not very noisy minority, are not prepared to sound the death-knell of the system.

Let us see what can be said for and against it. We shall proceed on the assumption that the servants will be unsuccessful in the efforts lately begun by some of them for a holiday frequently, and periodical half-holidays. The servants who advocate a continuance of the feeling market seem to do so mainly on the ground that it affords them an opportunity of meeting with old acquaintances and friends, which they would not otherwise enjoy, and also that it enables them to dispose of their services at the highest obtainable rate. That there is some force in the former argument any one conversant with the disposition and habits of the farm-servants will admit, but we are inclined to think the latter less defensible. Many of the male servants in the north of Scotland are particularly prone to form lasting friendships among their own sex, and sincere, though not always long attachments with the opposite gender. These endearments originate from the parties being employed on the same or adjoining farm, and at the expiry of the current six months, the friends, and it may be lovers, are separated by 10, 20, or even 30 miles. During the first half-year of separation warm friends of the same sex exchange a few letters, expressing their longing for a conference at the approaching feeling-market. And if the worthy son of toil is separated as above from his lady-love, they approach each other on paper much more frequently, and, it is almost needless to add, in very affectionate terms. In these epistles the feeling-market is pointed to as the first probable place of rendezvous. These circumstances account, in a large measure, for the indisposition of a considerable portion of the farm-servants to abolish the feeling-markets. It is seldom that more wages are obtainable in the market than good servants are offered before, yet many servants will not

engage till the market-day, even with old master, lest they should accept less might be got in the fair. The farmers prefer a continuation of the hiring fair, to do so chiefly on the ground that they have a greater field to select from than they have in the registration office, and the opportunity of getting, verbally, a private master's opinion of a servant, which they appear to value more than all the certificate the register office could contain.

The majority of those who disapprove the feeling-markets consist of *employers* and neutral parties. Some farmers complain of the want of opportunity in the market of inquiring into the character and qualifications of the servants. They may be informed by a previous master, but if they leave a servant in search of the old employer, the chances are that some less scrupulous *employé* engages the *employé* before the more experienced man returns. It is thus only in a verbal market that the verbal opinion of private employers can be ascertained. By means of registration offices and private negotiations, non-contents among the farmers believed could better suit themselves than in the market. The servants who desire a change in the mode of engagement are chiefly the class of hands, who are grieved to separate from inferior servants with, it may be, an excellent good appearance, getting as high wages as they can for themselves from comparatively strangers. Some of the servants also grudge the expense of a feeling market, and to so do without it—not always, however, those who grudge it most—it is very costly. The proportion of male servants who spend only a shilling or two in a market, is very small. A number spend from 5s. to 12s. each, and a few 20s. and upwards, almost all in the purchase of sweetmeats or “sweeties”—the same to their “chums” of the same sex, and the latter to their female friends. The master has a word to say in this matter, and probably from this point of view that the case against existing circumstances appears clamant. Judging from the scenes that take place towards the close of feeling markets might (and many do) conclude that the

vants are a very intemperate class—the ~~st~~ devoid of sobriety in existence. Such, ~~wever~~, is not the case. Granted that the ~~corum~~ at a feeing market in these northern ~~unties~~ is generally far from what it should ~~be~~, we have no hesitation in saying that the ~~antity~~ of spirituous drink consumed in the ~~urse~~ of a year by the farm-servants and ~~ountry~~ labourers, is less than is imbibed by ~~most~~ any other class.

The drunkenness and indecency manifested in the half-yearly markets is only very partially attributable to a keen appetite for the intoxicating liquid. It is more due to an unjudicious mode of demonstrating friendship, an unwise neglect of regular food, an unguarded mixture of drink and an ill-seasoned system to cope with liquor. When old friends meet in the market, a “gill” or a “glass” is readily indulged in. There is a stupid sort of notion among the farm-servants that the party who does not drink his friend’s health in a full glass of whisky or a tumblerful of ale, as the case may be, does not wish him well. If the market is held close to a railway station, as the most of them are, the greatest amount of intemperance is generally displayed there, among the crowds that gather to return home per train. The conduct of some of the ploughmen in the market towards the girls is extremely rude, yet it is astonishing the toleration with which the damsels appear to receive the caresses thus so unblushingly bestowed. A considerable portion of the illegitimacy, so high in these north-eastern rural parishes, is traceable to feeing market and term associations. Though, all things considered, we should like to see an abolition of feeing markets, we are convinced it would be impolitic to annihilate them abruptly. The agencies which it is intended should take their place, should be set on foot in the various parishes, and, if properly conducted, a few years’ experience will so materially diminish the attendance that the markets will be easily extinguished. It is almost unnecessary to add that the moral and economic aspects constitute our primary objection to the feeing markets; while we think indifferent servants with a tolerably

good appearance obtain, by this system, an undue advantage with better men, which could be avoided by a more closely scrutinized system. Monthly engagements have been advocated. The principal objection is the inconvenience that might arise to farmers by servants leaving them in the middle of harvest, or some such busy time. This we think could be got over by a fortnight’s notice on either side being rendered imperative. The practical result of monthly engagements would be that good servants would get into the service of good masters, and the skim of both classes would ultimately get together, which is just as it ought to be.

So much for the various modes of engagement. Now for a glance at the different systems of payment. Wages have increased very little for several years until last Whitsunday, when a uniform rise of from 8 to 15 per cent. has been given effect to. Male servants on the farm have been very well paid in the north-eastern counties of Scotland for at least a half score years. There is probably no part of the United Kingdom where farm labourers are better paid, yet even in these counties the servants are beginning to agitate for increased pay. Among other concessions, a good ploughman receives from £20 to £25 a-year with rations. If accommodated in the kitchen, he has his meals and that amount of money; if in the bothy, he has the money and 6½ bolls oatmeal, with an ordinary allowance of milk, potatoes, and fire, and generally the services of a female in the preparation of food, &c.; and if lodged in cottages on or near the farm, the *employés* have most of the bothy perquisites, but their wages are reduced some £6 a-year for the keep of a cow, with a few more pounds deducted for the accommodation furnished for the ploughman’s family in the cottages. The total earnings of good ploughmen and cattlemen may be safely set down at from £35 to £45 a-year according to qualifications. We would recommend that servants be paid monthly, and that those who are not boarded in the farm kitchen should receive money in lieu of meal, &c. More frequent payments would enable them to keep out of debt in a large

measure, and, as the majority of men who occupy the cottages and bothies seem to prefer money payments to the perquisites they have been in the habit of receiving, the farmer need not object, as everything his farm produces is as good as money to him now-a-days.

The agricultural labourers in several parts of England, notably Warwickshire, are not demanding much if indeed any more in respect of wages than their northern brethren have enjoyed for several years, and were it not that a concatenation of circumstances (pointed out in a previous article) have practically set the tenancy of land beyond the grasp of the great bulk of hired labourers in this district, we should be inclined to say they had no particular necessity for increased wages. Considering, then, that in the majority of cases the northern field labourer has now only what he can save of his annual earnings to stand between him and the poor-house in the evening of life, it seems desirable that the wages should be advanced. But the great difficulty is, can the farmers, with their high and rising rents, and expensive farming otherwise, afford a material advance to the farm-servants? This point does not come legitimately within the scope of the article, but we may be pardoned for giving it as our opinion that the northern farmer cannot give any sensible increase of wages to his servants and make ends meet. In these circumstances, and remembering that the farm labourer in the district embraced in this article is already more than averagely well remunerated, we would regard it as politic if the hired ones were to press the matter very gently on the employers. The pay scale of farm-servants is by far too uniform. It should be more graded, in order to reward merit properly, which is very desirable in all professions. The proposed change in the system of engagement would have a tendency to bring about this desideratum. Females employed at farm-work are very inadequately paid. They receive only from £6 to £8 a-year, with their board and lodgings. This is barely a-third of the wages paid to men. They should at least have

half as much as the fees given to males, and were not the demands on their purses lighter than those on the masculine side, we should suggest even a closer approximation, believing that the work performed would warrant it.

It would be difficult to disguise the facts that much of the sitting and more of the sleeping accommodation for servants in the counties embraced by this report, if not in the most of Scotland, is totally unworthy of the human race. The matter of better house accommodation, we are convinced, is the strongest point in the recent demands of the servants. In this respect, they—or some of them—have really good reason to agitate for an improvement, and thus far, at any rate, every unprejudiced man conversant with the existing state of matters will cordially sympathize with the movement. The bothies have had a long reign in the counties of Forfar, Kincardine, Aberdeen, Banff, and Moray, and when properly constructed, they do not prove so uncomfortable and demoralizing as has often been laid to their charge—that is to say, when the bothy is regularly cleaned and meals cooked by a female, and when the foreman is a man who can maintain order and decorum. In many of the bothies in the Angus and Mearns, and Strathmore districts—the centre of such institutions—arrangements as above have existed successfully for a considerable number of years, but there are, and have long been, not a few bothies in these districts, as well as farther north, where the internal arrangements have an unfavourable effect, physically, socially, and morally. More cottages should be erected on or near the farms; but at this stage the farmer considers the landlord should come to the front, and relieve him in a great measure, so that progress in this really deserving cause is slow, as it invariably is where a multiplicity of interests are involved.

On several estates in the north—notably the Duke of Richmond's, and Mr Gordon's (of Cluny)—cottages have recently been constructed in considerable numbers, but there is yet a great deal to do. The last-named proprietor builds cottages to his tenants for the use of servants, and charges only 3 per cent.

interest. But all the landlords cannot afford this, and few attempt it. The want of the necessary funds is a drawback, which might be more easily got over if it were properly defined what portion of the outlay, if any, the farmer should defray. But for the high rate of interest charged by the Enclosure Commissioners, more benefit would be derived from these loans. Landlords and tenants seem more alive now to the necessity for better house accommodation to the labouring classes, and when to this knowledge is added the hope that by providing good houses, the most of the other recently

announced demands of the servants may be departed from, we are sanguine that much will be done in the course of a few years to supply the felt want. The progress of this work, however, must depend a good deal on the manner in which the servants approach the employers with their shorter hours and more wages requests. It is probable their cause may be injured by an attempt to force all these omnibuses abreast through the rural Temple Bar, so to speak. True, the agitation among the servants has been mostly confined to Aberdeenshire, but such matters are very infectious, and may be carried too far.

TEXAS AS A FIELD FOR EMIGRATION.

A CORRESPONDENT of the *Scotsman*, who denies the "popular impression" that Texas is a lawless and unsettled state, gives the following account of its natural fertility:—

There are no beggars, and no poor-rates and every one willing to work can always sustain himself in comfort, and with ordinary diligence will earn a competency. This is particularly the case in farming and stock-raising districts. Emigrants from Germany—very few visit us from Britain—come here poor, and after a few years of hard work and rugged living they are found in easy comfortable circumstances, possessed of tracts of land, and owning large herds of cattle. Such facts as these becoming known, together with the opening up of the whole State by railroad communication, have a great effect, and the consequence is that crowds are pouring in, especially from the northern States, and still there is room for hundreds of thousands on the vast plains and river bottoms of Texas.

The peculiar advantages that the State possesses are its immense extent of territory, the salubrity of the climate, and the fertility of the soil. An idea of its extent may be gathered from the fact that it is estimated to

contain 280,000 square miles of arable land, much of which is unsurpassed by any of like extent on the American Continent, and is capable of supporting in independence and comfort a population of nearly *one hundred millions*. The population at present is about one million, and it will thus be seen what a field there is for emigration. The climate is extremely mild and salubrious, for although the thermometer rises to 95 deg. and 97 deg. in summer, and in Northern Texas a few deg. higher, the prevailing south winds from the Gulf of Mexico cool the atmosphere, and cases of sunstroke are unknown. In winter the temperature varies from 50 to 65 deg., and on the whole the climate is very uniform, being exempt from the extreme heat and cold of the Northern States. Florida is well known to be the resort of those in search of health, especially consumptives; but before many years Texas will be quite as favourably thought of in this respect. In the valley of the Rio Grande, which has been well styled the Italy of America, and eastward to San Antonio, lies a stretch of country entirely free from climatic diseases, and of the greatest salubrity, where we find the inhabitants living to advanced age, and not unfrequently meet with persons enjoying excellent health,

who, in other districts and in other States, had been suffering chronically from disease. The middle and upper country also bears a similar character for salubrity. The only drawback is the prevalence of chills and fever in low marshy lands, and in the vicinity of river bottoms; but these are confined to comparatively narrow limits. Yellow fever occasionally visits Galveston, but there has been no epidemic since 1867; and as extreme care is now taken to prevent infection from other Gulf ports, to which the origin of the disease has always been traced, and as sanitary regulations receive very careful attention, there is a reasonable hope that the city may not suffer so severely as in former times.

The fertility of the soil is proved by the large returns and the great variety of the products. Some of the products are cotton, sugar-cane, rice, tobacco, wheat, rye, barley, oats, &c. The fruits include orange, lemon, peach, fig, grape, plum, almond, quince, apple, pear, various kinds of nuts, &c., and almost every species of vegetable. The country, compared with the other Western States, is well supplied with timber, there being large forests of oak, ash, elm, walnut, cedar, hickory, pine, China tree, &c., and is well watered by rivers in almost every section. Countless herds of cattle graze on the rich prairies, and sheep husbandry is successfully carried on in Western Texas. The farmer has a great advantage over his neighbours in other States in the mild winter, which enables him to carry on his operations

all the year round. Thus, no sooner crop been gathered than he can c to prepare the same ground for the r and the ploughing is often done in l or January, or even earlier.

The mineral wealth of the Stat very great, and is beginning to attra tion. Horace Greeley visited Texas and christened it the "Land of Pro

The progress of the large cities very marked, notwithstanding ma vantages they have to contend again have had deficient internal commu and the harbours are not deep e admit vessels of heavy draught. T has had no railroad communication rest of the Union, and has been o do all her domestic trade throu Orleans by the line of steamships p tween that port and Galveston. drawbacks are being all removed, a revolution is being consummated. T Central Railroad is gradually extendi wards, while the Missouri, Kan Texas Railroad has been building sou and as the latter has now entered the part of the State, it is expected th the end of the year a junction will b between the two lines. The result give uninterrupted communication Mexican Gulf to the great lakes of t and make Galveston practically a s many millions of inhabitants, in a la ber of the States and Territories we Mississippi.

JONATHAN AND SIMPSON: OR MEAL AND MILK.

cottsman, in a very racy article on Iteration in general, has the following referring to the tampering with milk by two goblins of a character that householders would like to see from their tables :—

At recent eruption to the surface is a kobold whose name is Jonathan. He is a boreal spirit. Possibly he was sitting about in the fir forests of Norr Sweden with his antient compeer. At all events, his first appearance in this country is chronicled as taken place at Montrose, and, credibly asserted, in the shape of a spirit, though subsequent evidence is doubtful. Spirits, as is well known, assume any shape that pleases themselves. Jonathan clearly stated what the agency was, and named Jonathan to Scotland. The Michael Scott used to make use of powerful words when he wished to produce prodigious results. Possibly some good man at the thriving seaport where Jonathan appeared may have been over-anxious to solicit a subscription for some good cause, or other, and may in his earnestly-lighted upon some expression—perhaps an interjection—that had power to transform him into the meal-tub. For Jonathan's affinity, and though in retaining his normal shape he be, as he stated, sawdust according to the authorities, or corn-husks according to the others, he can so change himself that when making porridge are quite sure that it is Jonathan they are dealing with. It is not necessary to state that Jonathan does not make good porridge. He is not made of sawdust or corn-husks, there is no nourishment in him. It was not to be expected that he had bone and muscle that he was drawn from the underground regions. On the contrary, the purpose of his manifesta-

tion is to increase the profits of the lucky wizard who has control of him. Considering that he is almost entirely composed of woody fibre, and, if he be corn-husks, of fibre armed with silicated lance-points, it is no wonder that Jonathan does not comfort the stomachs that have been induced to trust to him for comfort, but that, on the contrary, his operations have a very strong tendency to turn a Midsummer Night's Dream into a Midsummer Night Mare.

It may be regarded as an evidence of the ubiquity of spirits to find that, though Jonathan's particular haunt be Montrose, he has turned up so far south as Yorkshire. He may have been busy enough about our own neighbourhood for ought we know, though we have not seen his presence noticed. If he continue his southward progress, he will not fail by-and-bye to meet—he may already have met—with a kindred spirit of the name of Simpson. Simpson is a London gnome, whose efforts, laborious and not of recent date, are directed towards producing an appearance which, when carried about in pails, is believed by a simple-minded public to be milk. Simpson's history is a little obscure. Perhaps the most reasonable account of him is that which attributes his existence to the intervention of Apollo. Vexed at the incessant efforts of the London cow-keeper to get more out of a cow than the poor creature can supply, that deity who cares for cattle directed the attention of the avaricious dairyman to the existence of the cow with the iron tail, whose produce, judiciously mixed with chalk and other condiments, would greatly lessen the strain on the productive powers of his *protégés*. Upon this hint he pumped—did the dairyman—and Simpson was the result. Simpson has servants that are zealous in aiding him in his cantrips. Of these, chalk, already alluded to, is the most mentionable. The others are of

a too malign aspect even to be named. For a considerable time past, Simpson has been a potent spirit in the London milk-world. The very clergy themselves, instead of casting him out by the help of Latin and other appropriate exorcisms, are said to drink him and submit. There is little doubt that, just as Jonathan is extending his haunts southward, so Simpson is making excursions every day more comprehensive and far-reaching towards the north. In every town of any size, the equation between a cow and her milk is getting more complicated and insoluble; and there be can be no doubt that it is Simpson that is causing the confusion that is found to exist in that part of mathematics. Great results may be expected when Jonathan and Simpson meet. A feast of porridge and milk under their auspices will be something more than ambrosial. The British Grenadiers, thus fed, will be certain to carry all before them. Inspired by Jonathan and Simpson, they may be expected to go anywhere and do anything.

Agricultural Engineering.

MURRAY'S BRICK-MAKING MACHINE.

improvement of the dwellings of agricultural labourers is one of the important matters in connexion with it, and still continued, discontent in districts. Many of the cottages unfit for human habitation; and the scarcity of good cottages in the depends not a little upon the expense of building them. Everything, therefore, that will tend to reduce the cost of construction is to be recommended. Mr Murray's continuous delivery brick-making machine, by reducing the cost of producing bricks, calculated to be an agent in promoting the comfort of the working classes. The following account of the machine, which we borrow from *Engineering*, was given in a recent suit:—

The use of action was the infringement, by Clayton, Sons, & Howlett, of Murray's continuous delivery brick-making machine. Before entering into the particulars of the Chancery suit, it may be as well to describe this apparatus, of which we have an engraving. Fig. 1 of our engraving is an elevation of the machine; fig. 2 is a plan of the cutting table; fig. 3 is an enlarged section shewing the mode of attaching the cutting wires to the bottom bars; and fig. 4 represents an end view of the cutting table. The apparatus consists of a pugging mill, moulding die, and cutting table, the two latter apparatus being protected by separate patents; it was the subject of the recent litigation. The pugging mill is cylindrical, instead of the form of an inverted cone, and the continuous delivery machine requires no complicated arrangements for cutting off the clay, as in the ordinary intermit-

tent action machines. The cylindrical form enables it to be worked with less expenditure of power than those in general use. The clay on leaving the pugging mill is conducted to the die, which is so constructed that the faces of the clay are lubricated, the clay being thereby delivered with less friction, and consequently with a smooth and even surface. For the purpose of imparting to the clay a thin film of lubricating material which will insure this smoothness of surface, the sides of the die are made hollow, and contain the liquid lubricant, which exudes from the hollow sides through holes made in their faces. The perforated faces are covered with felt, which becomes saturated with the lubricant, and prevents it running out too quickly. The hollow vessels forming the sides of the die are held in place by screws passing through lugs formed on the mouth of the machine. They are readily removed for cleansing or covering, and are replaced without deranging any other parts of the machine. The lubricant is supplied continuously to the boxes from the cylindrical reservoir shewn in our engraving. The clay, in passing on to the cutting table, impinges upon the felt-covered boxes, and carries away with it the necessary thin film of lubricating material.

Assuming that a quantity of clay of sufficient length to form twelve bricks has issued from the mould, this length is cut off by means of a vertical wire, mounted in a reciprocating frame, which moves to and fro on guides affixed to the side standards. The proper length of clay thus severed from the advancing mass is moved forward by hand on to the cutting table. Arrived there it receives a lateral push, at right angles to its line of previous motion, which forces the mass against a series of fixed wires. This lateral

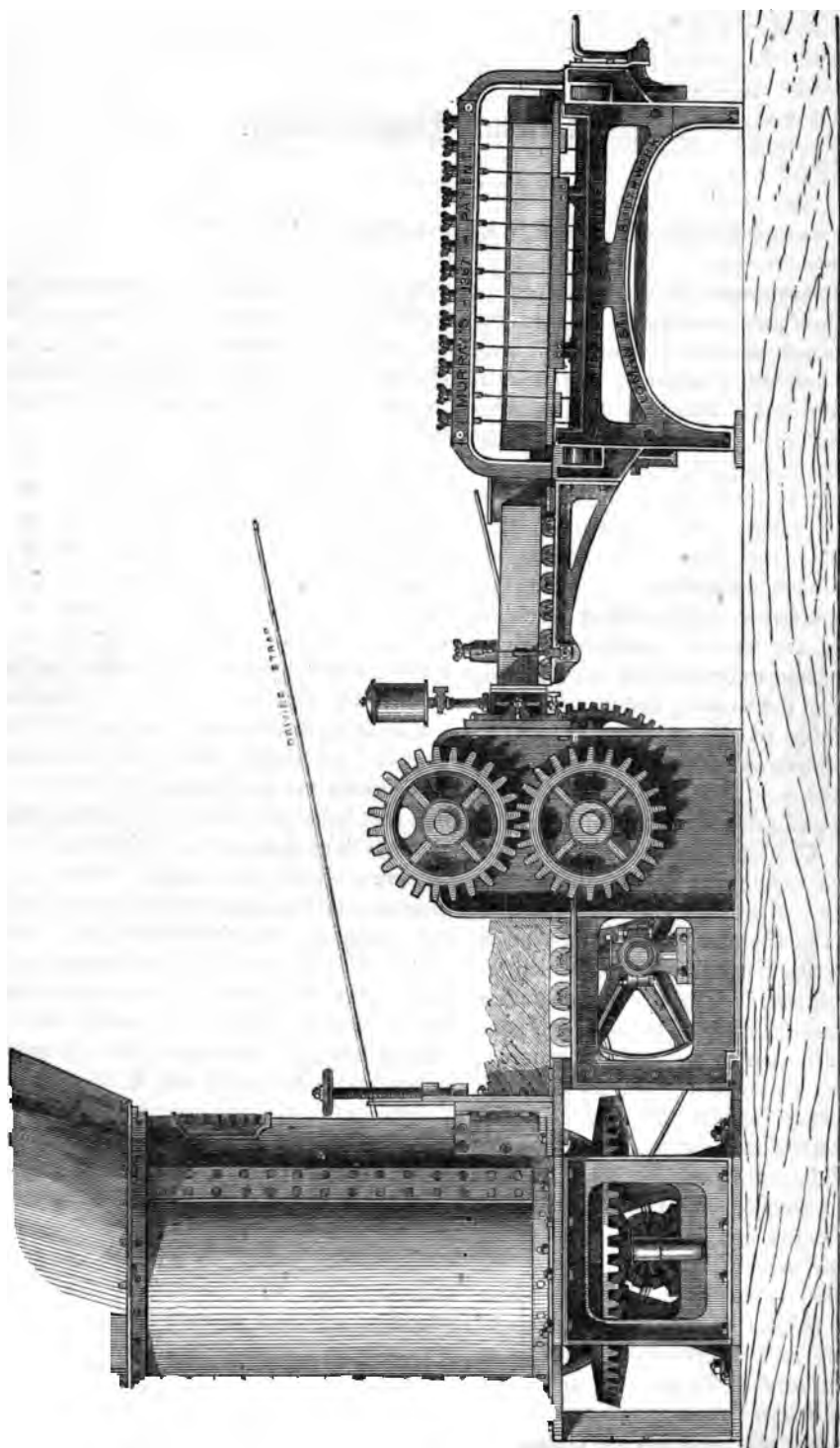


Fig. 1.

movement of the clay is effected by means of a push board, which, as it advances, pushes the clay against and past the fixed wires, thus dividing the mass into the required number of bricks. The push board is actuated by a rack and pinion motion under the table, best seen at fig. 4, and which is worked by a crank handle. On this handle being thrown back a weight causes the push board to be at once run back to its original position. The bricks thus formed are by this lateral movement deposited on a portable board, on which they are removed to the barrow. Referring to fig. 3, it will be noticed that the bars to

consequently diminish the working power of the intermittent delivery machines with rotary action dies in general use. As the block of clay to be divided upon the cutting table is only 1 inch longer than is required, a very small amount of waste is thrown back for second manipulation. The removal of the bricks, too, from the machine is effected without their being handled, so that they sustain no injury from that source. It requires but one set of men to one of these machines, so that a great economy of labour results as against an intermittent delivery apparatus, which requires two sets of attendants, with

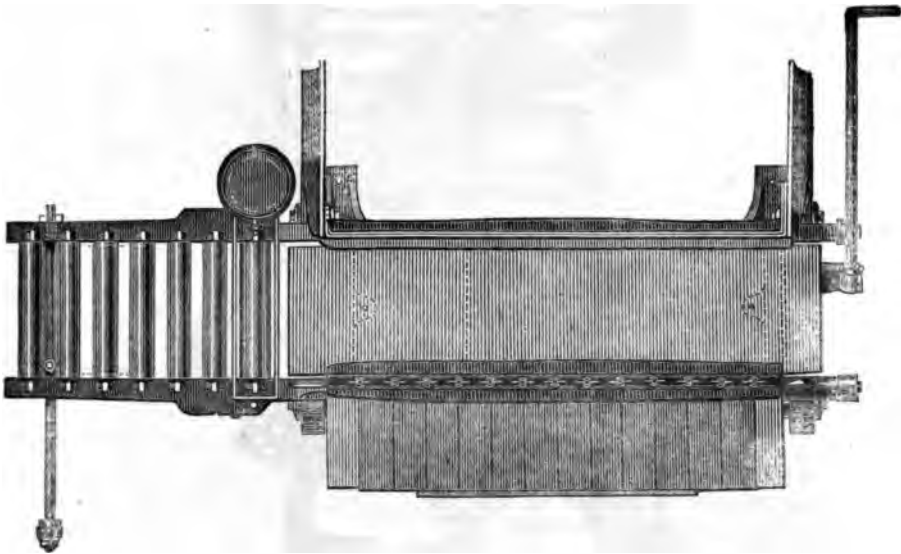


Fig. 2.

in the cutting wires are connected are fixed. The wires are attached to pins in the upper bar with screws and nuts, and are held taut by means of india-rubber tension bands. The bars being slotted permits the wires to be shifted either farther apart or brought together, thus altering both their gauge and angle, so that the thickness and the bevel of the bricks can be varied to suit the requirements of manufacture. The cutting table is one of the numerous advantages possessed by Mr Murray's apparatus, and which dispenses with several auxiliary mechanisms which necessarily encumber and

out a corresponding advantage of making a larger number of perfect bricks. In the arrangement under notice, brickwork foundations are unnecessary, the machine being mounted on cast iron foundation plates.

Such is the apparatus—or at least a portion of it, the cutting table—which gave rise to the action between Messrs Middleton & Company and Messrs Clayton & Company. To render this clear we should observe that in Messrs Clayton's machine the clay runs on to a lubricated metal table, and by a turn of a handle from left to right this table is made to pass under a fence board, which is attached

to the frame of the machine, and, being fixed, retains the block of clay in a stationary position, whilst the table recedes from under it. A series of cutting wires travelling with the table pass through the clay, which is left in the shape of bricks on a portable

the standards, the wire bars, and the brackets upon which the portable board rests, are all stationary, being attached to the framework of the machine. The clay is delivered on to the lubricated metal receiving table, and by the action of the lever from right to left—

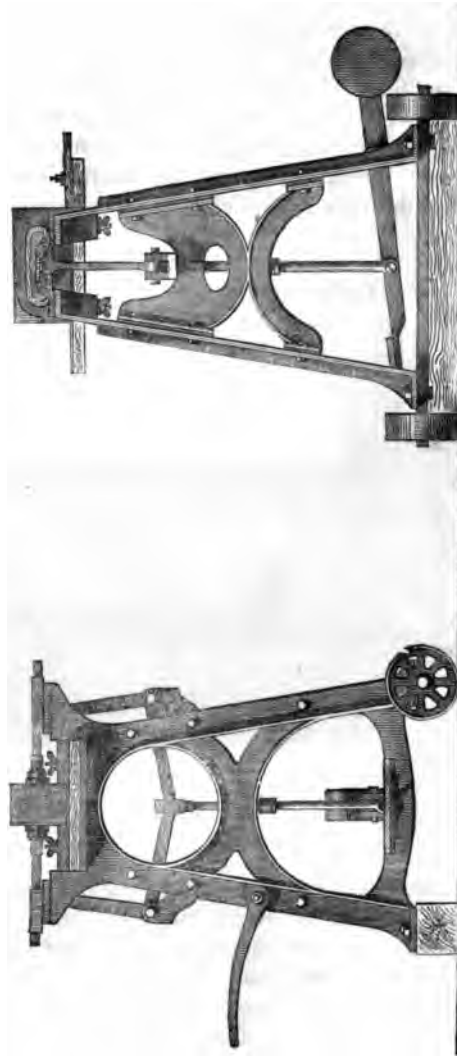


Fig. 3.

board on the other side of the wires. By a reverse action of the lever, the board with the bricks upon it is placed in a position to be removed from the machine, and the metal table is ready to receive another block of clay. On the other hand, in Mr Murray's machine the metal receiving table,

just the opposite of the movement in Clayton's apparatus—the push-board is brought up to the block of clay, perfectly parallel with the series of fixed wires, and by being pushed past the wires by a uniform pressure, the clay is cut into bricks with the utmost accuracy. The act of dividing the clay into

places the bricks on the portable board the wires.

colourable imitation of Mr Murray's on led that gentleman, in January o apply to the Court of Chancery for nction against Messrs Clayton, to rehem from manufacturing and selling achines, upon the grounds that they ifringements of Mr Murray's patent ; ese machines embodied, in fact, but a sition of the parts, and a reversing of tion of Mr Murray's apparatus. Mr 's patent, we may mention, was dated

the first and true inventor, and had produced, as to the utility and the *de facto* novelty of his invention, a mass of evidence—as to which there had been no cross-examination and no contradiction—"in my mind," said his lordship," stronger almost than any I have ever witnessed in any case in this court." The witnesses in the case were engineers, a superintendent of Government works, and practical brickmakers, the sum of whose evidence went to shew that the invention was both efficient and original. One of the witnesses spoke to the bricks being worth 2s. a-thousand

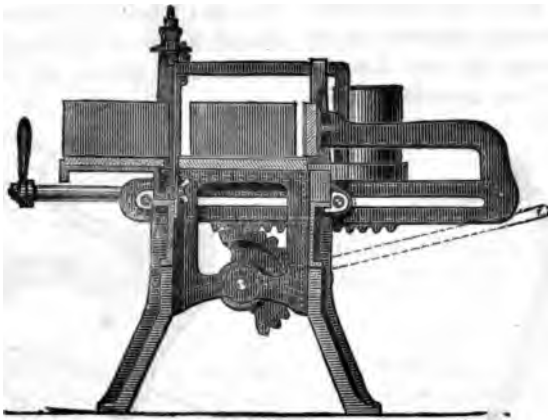


Fig. 4.

1866, Messrs Clayton's being dated 1868. The cause came before Chancellor Bacon, who dismissed the costs in January last. The Vice-chancellor came to the conclusion that the 1st's patent was invalid on the ground that it has been anticipated by prior inven-

Conscious of the strength of his cause, Murray appealed to the Lords Justices, who on the 6th of last month delivered judgment entirely and unreservedly in his favour. In delivering judgment Lord James observed that Mr Murray had in his own statement of his having been

more than those made by ordinary machines, while Mr Bernays, the Government engineer, spoke very highly of the superiority of the apparatus over those in general use. To sum up, the Lords Justices were of opinion that there had been no anticipation. They considered the plaintiff's case was fully made out, and they granted him a perpetual injunction against the defendants, who had to pay the costs of the suit. There can be no question as to the perfect equity of this decision, and the only wonder in our mind is how Vice-Chancellor Bacon could possibly have arrived at the conclusion he did.

AN IMPROVEMENT IN CATTLE-TYING.

IN our number for July, page 20, we gave a notice of a method for confining cattle by stanchions. We this week furnish engravings of an improved plan of tying cattle, which a correspondent of an American contemporary says has been attended with very successful results in his own experience. Stanchions, there is no doubt, save much labour in tying, but they cause not a little trouble in currying, inasmuch as the animal is unable to move its head for the purpose of alleviating any irritation which

any pedigree, and they are as peaked as anybody's cattle, but I like the milk and butter. The old way of slitting the knotted end of a rope into a half inch the bight (fig. 1) will hold a creature's horns if the horns are big, or if the rope is drawn snugly to its place, and the rope is a limber one; but such a plan is a careless one, and I believe I have got a better one. Half-inch rope of jute is cheap, and the fibre is tender, yet it will wear



Fig. 1.—Old way of Tying.

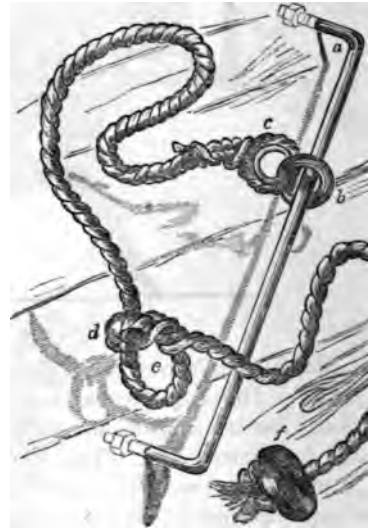


Fig. 2.—Improved way of Tying.

may take place at any part of its body, and the attendant is often compelled to rub all over the cow, which, if its head had full freedom of action, could be obviated. "As my double stall is rather narrow," says the correspondent, "tying by the neck would not do, for the two-year-old heifer would gouge the yearling, unless she were fastened so short as to knock against the manger with an awkward cramp in lying down and getting up. So we must tie by the horns. And the bug horns of these Jerseys are not much to tie to. At present I have some cheap Jerseys, without

under cover, and a poor rope gives when it is ready to break, as poor it is not.

It takes $5\frac{1}{2}$ or 6 feet of rope to tie my way. There must be a staple of $\frac{1}{2}$ inch iron, 15 inches long, bolted $\frac{3}{4}$ of an inch distance, to the plank of the manger, as seen at *a*, fig. 2. A 2-inch down upon this staple slides a 2-inch $\frac{1}{4}$ inch iron (*b*), to which one end of the rope is spliced with a $\frac{1}{2}$ -inch thimble in the eye of the splice. The first thing is to make a loop (*d*, fig 2) 2 or $2\frac{1}{2}$ f

ing, according to the size of the animal. It is very easy to shew, but it will require some time to describe it. First open a strand at an end of the rope through, drawing until the eye of the loop is but little larger than the rope itself (*b*, fig. 3). Then pass your marline-spike, a tapering bit of wood 10 inches long, open a strand of the rope that you have just put through, as close to the loop as possible (*c*



Fig. 3.



Fig. 4.

, and pass the other end (*d*) through. Pulling *a* and *b* tight we get a loop (fig. 4) which is always open, and will not slip out of the rope.

This is the loop shewn as *d*, fig. 2. To shew this loop put the end of the rope into the loop to hold the ring, and you have a slip-knot (*e*, fig. 2). Splice the ring in its place,

not forgetting the thimble, to prevent chafing. The outer end of the rope might be knotted with a man-rope knot by an old sailor; but a button $1\frac{1}{2}$ inch across (*f*, fig. 2) cut from a 1-inch board of some tough timber, with a hole in it for the rope, is quite as good. A symmetrical knot for holding this in place can be made by straining 6 inches of the end of the rope, and turning the strands, one at a time, down, under, and up, within itself, after the method of a half-knot. The second strand will include the first within its loop as it is turned under and up, and the third strand must include both of the others. If this be done rightly, and the strands drawn snugly in their places, the ends will come together in the centre of the knot, where they may be clipped short. It is but the work of a second to pass the rope around the animal's horns, and slip the button *f*, fig. 2, into the slip-knot *e*, which is always ready."

This would make a capital plan for tying animals round the neck, and if the button were made of lead, or pewter, or of iron, so as to balance the weight of the ring, as it slides upon the iron rod in the different positions of the animal, we believe it would be still better. The correspondent states that all the farmers who have seen the working of his system speak highly of it—the ropes are so handy to fasten and unfasten, and so unlikely to get loose by accident.

TRIAL OF GREEN'S MOWING MACHINES.

MR. FIELD gives an account of a trial of Mr. Green's new mowing machine which took place at Wimbledon. It says:—The first thing which Mr. Green proposed was to shew that his machine would mow moderately long and wet grass, and these important points he certainly carried out with his machine of the A.E.C.C., which he put in good order for that purpose, but which, as we have before stated, it and others have tried when in ordinary working order,

have always failed in effecting. The grass was quite dry in consequence of a hot sun, but it was thoroughly saturated with water from the hose used for the purpose before trying the machine. Still the trial was not so satisfactory on this point as it would be if the grass were wetted by rain. He also produced an improved 14-inch machine, about whose power there can be no doubt, inasmuch as, while it will do exactly the same work as the ordinary machines, it is capable

of being altered so as to do all the Archimedean professes to do. This is effected by removing the front rollers, and leaving a 2-inch roller on each side, occupying the place of the Archimedean slide, while the back cover of the cutters, which throws the cut grass forward, is also removed in a very simple and efficient manner. When these alterations are made, long or wet grass, or both combined, are readily cut and distributed, exactly as they are by the American machine, to which fact it is assimilated in principle almost precisely. Whether working in this condition, or with the front rollers and box on, the labour necessary for mowing was very small, perhaps even less than that demanded for the Archimedean in its best condition. Of course the machine was produced in perfect order; but, allowing for this, it certainly is a triumph of art, and perfectly fulfils all the requirements of the All-England Croquet Club, several of whose influential members examined it, and highly approved of it.

Next as to time. Mr Green shewed that a single ground could be cut and the grass picked up within the time (one hour) usually occupied by the gardener in mowing and distributing the grass with the Archimedean. Accordingly, he set one of his men to work, who, as might be expected, went at it faster

than a gardener who had a day's work before him would do, and cut it in thirty-five minutes. Everything was in his favour, for the cut was short and dry; but still the performance was an excellent one, and left no doubt in our mind that the machine, in its ordinary working condition, will cut and collect as fast as, or faster than, the Archimedean cutter, each being worked by the same man; and, deducting the time necessary for emptying the box, which with a heavy cut is considerable. While, therefore, we have hitherto contended that Mr Green's machine has been beaten by the Archimedean for large croquet lawns, in point of rapidity of work and power of cutting long and wet grass, the result of this trial shews that the improved machine exhibited lately at Wimbledon has all the advantages of the Archimedean without its drawbacks. In point of quality of work, two of the grounds which had that morning been cut by the gardener with the Archimedean were admitted by all present to be as well mown as that cut by the Green's machine.

We have carefully tried the two machines on the grass immediately after rain, and find that the Archimedean had slightly the best of it, both in point of labour and quality of work done. The difference is very trifling.

The Farm.

THE TURNIP BEETLE AND CROPS.

port from the eastern parts of shire as to the growth of wheat so satisfactory as could have been a correspondent, writing from the strict says, that wheat will in all prove below an average, though few exceptionably fine crops. Oats look well. Turnips, although only an appearance above ground, much injured by the turnip turnip fly, improperly so-called." ondent has the authority of Mr he author of the "Book of the he statement that it is not the fly njures the turnip—it is the flea- *altica nemorum*. The Rev. J. escribed this insect as scarcely length. It is, he said, "smooth, d of a brassy black colour, with a of green, particularly on the wing antennæ black, with the second ints, and the apex of the first with r."

ttle insect is doing a considerable damage in other places than York-ason, it will not be inopportune ttle more of what Mr Duncan—there was no better entomologist nsects injurious to farm crops are —wrote about this beetle. He he thorax is convex above, and ly punctured; the wing cases are d irregularly punctured, each of a pale yellow or slightly sulphur tripe running along the middle, ards posteriorly, and not reaching e extremity; the under side of the highs, black."

can then goes on to tell us that this such an admiration for the tur-that in its larva, as well as in its

perfect state, it takes a gourmandizing interest in it. *Haltica nemorum* is, however, only fond of tender and young things. When the plants have acquired some degree of strength, and the foliage is considerably developed, the injury done by it is insignificant; but, unfortunately its favourite food is the young plant just as it is beginning to unfold its cotyledon leaves." These, all farmers know to their cost, are very soon devoured. A London Alderman has no consumptive powers equal to these little insects. Again, quoting from Mr Duncan, he says:—"An individual who confined a few, for the purpose of observing their habits, found that they consumed ten young turnip plants in a day. . . . They are found to attack the turnip plants as soon as the latter make their appearance; and one of the difficult points to determine is how they are produced so speedily and so opportunely [inopportunately?].

Mr Duncan quotes H. Le Keux as to the habits of the insect. "The sexes pair from April to September, during which period the eggs are deposited on the under side of the rough leaves of the turnip. The female insect apparently does not lay above one egg daily; in a week, ten pair were found to lay only forty-three eggs."

The larva of the flea beetle looks by no means a dangerous creature. When the maggot comes into existence from the egg, at the end of ten days it is about $\frac{1}{8}$ th of an inch in length; but small as it is, it at once sets to work under the cuticle of the young turnip leaf, and burrows among the pulp. Nice little galleries they make in the leaves; pretty for a naturalist to look at, but anything but pleasant for farmers, who have their oxen in the stalls or their sheep in the fold, to contemplate.

In a couple of weeks or so the maggots have gorged themselves sufficiently, and then they retire below the earth for another fortnight in order to get their wings, and do more mischief when they emerge into the light of day.

These beetles are not easily got rid of when they make their appearance. Like a bad half-penny they constantly keep turning up. The author of "The Book of the Farm" thinks that the remedies against the attacks of this insect are "of a hopeless character," and that prevention is better than cure. The cautionary measures that Mr Stephens recommends are as follow :—"To keep the land clear of all weeds, and especially of the cruciferous kinds, wild mustard and charlock, which are the favourites of this beetle ; to sow the turnips in drills instead of broadcast, but whether difference in culture makes the crop less valuable I do not know, although the attacks of insects being less frequent in Scotland than in England would lead to such a conclusion, to sow the seed thick and of the same age, for the more rapidly the plants grow at first, they are less often attacked ; to put the seed for some time before being sown amongst flour of sulphur, and to sow the sulphur amongst it. It may be that the juices of the plant are so affected by the sulphur as to cause disrelish for it, while the disagreeable odour

arising from sulphur in no degree injures the vegetative power of seed or plant. Being a simple material, sulphur is worth trying by those whose crops are often affected by insects. As a remedial measure, a long haired hearth-brush switched along the drills by field-workers causes the insects to fall from the plants better than a board or net ; and if quicklime were strewn immediately upon the plants, as recommended by one hundred and two practical farmers of the Doncaster Agricultural Association, their destruction would be more certain." This about the turnip beetle at this time of the year, is interesting.

Clover and ryegrass pastures generally, our correspondent informs us, are remarkably good. "Potatoes," he adds, "suffered much from a very severe frost which occurred about a fortnight or three weeks ago." Again he says :—"A friend of mine told me the other day that by sprinkling nitrate of soda over the top of the rows after setting, prevents frost from injuring potatoes in the spring months. He so treated his potatoes this year, and although his neighbours suffered, his crop was uninjured. Many farmers about here have only in part sown their turnips. Swedes are sown, of course ; but other varieties are only partly sown or unsown." The crops, as a general rule, however, are not looking badly this year, although the thunderstorm of last week did damage over a large extent of country.

PASTURE AND SOILING.

It is a well known fact, that the most successful farmers are those who are able to produce the greatest quantity of food for their stock, and that the most profitable use of the land is to produce the greatest quantity of food for their stock. The most successful farmers are those who are able to produce the greatest quantity of food for their stock, and that the most profitable use of the land is to produce the greatest quantity of food for their stock. The most successful farmers are those who are able to produce the greatest quantity of food for their stock, and that the most profitable use of the land is to produce the greatest quantity of food for their stock.

farmer's judgment here is best displayed by, and is almost restricted to, selecting the description of stock which thrive and pay

best on naturally rich lands, or on soils of average quality, under a course of regular cultivation, that we mean our observations to apply. Such soils, even in seasons only moderately favourable, will yield a good crop ; while in periods of alternate sunshine and shower they are certain to give

. And whenever a large crop is here can be no doubt that it is better account by being cut and the cattle than by placing a herd over it. In the former case there is no waste, in the latter there always is. All animal physiologists concurring that the less motion creatures are put to, the greater increase will be acquired from a given amount of food. We have never known this doctrine overturned by practical farmers. And it is known that in pasturing—even where food is abundant—bestial make a great deal more where they satisfy the cravings of the stomach, while the weather may (and is) frequently is, too hot to-day and cold to-morrow for stock to increase in condition. In *properly ventilated* stalls, and covered courts (of the building of which there is no difficulty) the maintenance of a tolerably uniform temperature is easy, and the cattle will lie down in comfort, and will make rapid advances to maturity.

Now about the question of manure? That too the advantage is all to the side of soiling, the manure produced by being retained in all its original strength, ready to be applied at any profit, and, when the full benefit to the stock is secured. In pasturing, it is much to say that the value of more than half the droppings is lost, while in places (such as near gateways, watering places, and in sheltered situations), a great deal of manure is deposited, and in more open situations a very meagre quantity is left. Farmers see how the soil droppings of the stock are scorched up almost to-morrow! In seasons even the liquid droppings do not being too powerful without admixture, as witnessed by the burnt-up soil, which, on light soils more especially, does themselves every here and there to the detriment of the uninitiated. Moreover, the grass used in soiling will go quite as far as doing as 4 acres of pasturing. Here, the mowing machine comes in very handy, and cut down much or little as wanted,

the horses taken from which cart home the rich and juicy grasses.

Having pointed out the superiority of soiling over pasturing, it will be expected that we should shew how it can be best carried out, and in particular, how straw for litter, &c., is to be forthcoming in summer and winter as well. It will be remembered that we go in for covered courts, and the entire avoidance of all waste of straw *throughout the year*. If the straw is husbanded properly in winter, and when occasion requires it, supplemented by placing a little hay in the racks, there is no fear of any short-coming for the soiling season. One other point. When one resolves to practise soiling, he must not keep an over-stock in winter, and he must have a goodly proportion of swedish turnips (and if he can grow them well, an acre or two of mangolds) to serve his cattle till his first cutting of grass is ready. Every farmer can count on this period pretty well for himself, the usual time of which will be accelerated by a liberal top-dressing of either farm or other manures in early spring.

But where farmers cannot or will not, or at present do not find it convenient to begin to soil their cattle, we think that a vast improvement on the ordinary method of pasturing should be adopted. The too common plan is to have the whole of the pasture-brake in one single field, in which the cattle, horses, &c., have to pick up their living from beginning to close of the season without a change. It is impossible for stock to thrive under such management. We believe in large fields in general; but not in large pasture fields in particular, for in such, where the stock have no shift or change, they are from day to day strolling over the same ground, yet never getting a fresh bite.

Fields, of course, should always be proportioned to the size of the farm; but we hold it to be most desirable never to have less than three separate grazing portions each season, so that the stock may feed in one for fourteen days or so, then shifted to the second for a like period, and by and-by changed to the third; now again replaced in the first eaten portion, and so on to the end

of the season ; and the solid droppings should be carefully spread in rainy weather. In this way the grass grows better, and the cattle thrive better. It is impossible but that they should, being regularly changed in new fields and pastures, which were bought at the cost of a run or fence.

FARMING IN SUFFOLK.

By Mr R. L. EVERETT.*

IN his "Fifty Points of Agriculture," written during the reign of Henry VIII., Thomas Tusser represented Suffolk as one of the best cultivated parts of England. At that time the greater part of the county was unenclosed, and Tusser was an advocate for enclosures. He spoke of the damage done to crops by cattle going to fairs. In his day an abundance of cattle were reared in the county, and in that respect Suffolk had undergone a great change ; but in respect to the large number of hoggs then produced by Suffolk, there had not been much change, except in the quality, which was much improved. In those days two of the principal products of Suffolk were cheese and butter, which were largely exported to the Continent. Then the cheese was highly esteemed, but now it was supposed to be as hard as a millstone, and likely to turn the edge of the axe or knife with which it might be cut. Tusser also spoke of the cultivation of hemp, and said that almost every farmer grew a small portion, which was woven by the women for domestic uses. In the discontinuance of that practice, the county had lost one of the most valuable employments their ancestors had. One evil the agricultural population suffered from in the present day, was the want of something to do when the day's work was over. Another writer on Suffolk agriculture, and much more famous in his day than Tusser, was Arthur Young, who wrote about a century since. According to Young, a better system of agriculture was practised in Suffolk than in any other part of

Great Britain. The ploughing was with two horses, and the practice was to make long fallows—much longer than would be possible to make now successfully. Swedes were just introduced by some of the most successful farmers : but what a change has the scene since those days ! In the present day were about double what they were when Young wrote. All the farmers were making great hedges (where they were permitted) believing that the larger their field the more likely they were to secure remunerative crops. It can be seen in the county to-day what has improved ; swedes, beetroot, and other rarities in the days of Young—can be seen in abundance ; while clover, lucern, and other plants, contrived to the prosperity of the agriculture of the present day. Improved manures, and draining—much more practised now than formerly—have been used to produce the most satisfactory

REARING SUFFOLK HORSES

As to the famous Suffolk horse, for all its agricultural purposes, its history is in obscurity ; but the earliest record is that an independent breed existed in the county, and that the Suffolk horse was famous for the same characteristic it possesses to-day, though improved in size and colour. One old writer has described the animal as "half horse and half dog," which, in a jocular sense, was no description of the compact, thick

* Read before the Maidstone Farmers' Club.

familiar to the eye in the Suffolk horse. In days long since, Suffolk was famous for its best breed of the present day had been greatly improved by a judicious selection of the best animals, with a view to correct those faults which had previously existed. Almost all Suffolk farmers were breeders of horses. A few colts were reared as the cheapest and easiest way of keeping up the horse stock on a farm, and, speaking generally, that system prevailed all throughout the county. The greater part of the farmers preferred having a horse to sell rather than to buy. In Young's time, six horses were used on farms of 100 acres, but the means of cultivation had so much improved, that now the standard throughout Suffolk was four horses on 100 acres. The tendency of farming was to crop as much as possible and to plough less; and at the present time farmers were rejoicing in the introduction of the double-furrowed plough, which (Mr Everett) believed was an old instrument revived in an improved form; and which, when used on light and level lands, could do as much work with three horses as two single ploughs would do with two horses each. But on heavy soils, taking all kinds of work into consideration, the double-furrowed plough would never supersede the single plough, though it would enable the Suffolk farmers to reduce the number of horses on their farms. As to the manner of keeping horses, the tenant was never dependent on the landlords for the kind of shelter he had for them. As a rule, horses were very rarely turned out to pasture. They were baited in stables, and then turned out for the night into yards, some of which had sheds, while others were simply fenced round. The ordinary amount of food given to a horse in a week was 1 bushel of beans and 10 cwt. of clover-hay, but since maize had been introduced, it entered largely into the food of horses. By some farmers it was ground up with beans, but a better plan was to soak it for about twenty-four hours. It swelled immensely, and the water altered the nature of the maize. Used in that way with corn, chaff, and a little bran, it was the cheapest food that could be given to a horse.

In days long since, Suffolk was famous for its cows.

SUFFOLK AS A GRAZING COUNTY.

The Suffolk cow was a small animal, and it was said that in old times it had horns; but he had never known any one who saw a horned Suffolk cow. Old books told them that it was of a dun colour, quite small, but exceeded by one other breed for its valuable milking qualities. Now, however, the animal was quite changed in colour, and very much improved in form. What was now called the improved Suffolk breed was a red animal, a good deal resembling the polled Scot, excepting in colour. It still retained many of the valuable milking qualities of the old Suffolk cow, while it was much more pleasing to the eye, and was not a bad animal to graze. For dairy purposes they were very useful, but beyond that there was no trade in them in the county, nor, as a rule, were they the animals which the farmers of Suffolk grazed. Cows for that purpose were bought out of the county. After referring to the superiority of the north country or Yorkshire shorthorns for grazing purposes, though many Irish shorthorns were fast being imported into Suffolk, the lecturer said another practice prevailing in the county was to buy up the calves from Buckinghamshire and other counties, as soon as they could be taken from their mothers, and to wean them at home. When meat was very high he thought that was a wise plan. The manner of weaning calves was to give them sweet-milk, gruel, linseed and bran, with a few pulped roots, or anything else they could be got to eat. The practice has one requiring some little skill and attention on the part of the man who had the management of the stock, but it was carried on to a considerable extent by many farmers, who thought it was a means of spending less and bringing more in. In addition to the Irish cattle, a few Welsh were brought over to be fed on the marshes in the summer, but no one in Suffolk thought of buying Welsh cattle to graze in the winter. During the past year Dutch cattle had been introduced

ey were usually let in larger quantities than e other descriptions of land ; mixed soil d heavy soil lands were let in farms varying om 50 to 300 or 400 acres, but 200 acre rms were the most common. The light nd farms ranged from 200 to 3000 acres, t the greatest part of them averaged about 00. On such farms the rule was to keep e land cropped, but on many of the light nd farms some portions of the land was so or that it did not pay to cultivate it on the ur-course system, and on such land the rmer would only take a crop once in two r three years, giving it rest in the interval. he maxim with the Suffolk farmers was, if ey wished to find their way to the work- ouse, to farm high on light land. As to anures, they used to cart it on in hills, and rm it over twice, but that system was quite xploded, though they were sometimes bliged to make hills when they wished to mpty their yards. But they made as few as ossible, and those they did make were only rmed over once.

THE CONDITION OF THE LABOURERS.

With reference to wages, perhaps the least hat was said on that subject the better, for he masters thought that if the men were quiet they should be quiet too. The average ay of the labourer in Suffolk was 12s. per week, but the horsemen got from 1s. to 2s. a week more, according to whether he was nder or upper horseman. He found from his own accounts that the extra wages paid o the men for task work, for haymaking and arvest work, amounted to about 3s. per week all the year round, so that the average

pay of the labourer in Suffolk was from 14s. to 15s. per week, besides which their cottages were let at small rents ; they generally had a piece of garden, and got good wholesome milk for little or nothing. Their position would therefore compare favourably with that of labourers in towns earning 17s. per week. As he had before stated, the labourers in Suffolk were quiet, and if they made a stir they would probably go farther and fare worse. There was, no doubt, vast room for improvements in the agriculture of Suffolk ; the farmers could do with less game, of which he heard bitter complaints from some quarters. He did not wish to see partridge and pheasant shooting done away with, but he did think the ground game might be very well dispensed with. Great improvements were required in the farm buildings in some parts of the county, and better accommodation for stock was sadly wanted. Their treament of manure was also capable of great improvement ; and another thing much needed was the application of more capital on the land. He did not think it would pay to expend more money on the light lands ; but on the mixed and heavy lands there was a large field for the application of capital—in the shape of draining, deep cultivation, and the keeping of almost an unlimited quantity of stock. There was one thing he hoped to see, and that was better security for the tenant's capital ; so that while the landlord had justice done to him, the tenant would be made secure for any money he might lay out. While there was room for much improvement, Suffolk could still hold its own as a well farmed country.

STEAM CULTURE AND CLAY SOILS.

MR F. W. BIGNELL, of Loughton, Stony Stratford, pays the following well deserved tribute to the superiority of steam over horses in the cultivation of clay soils. He says :—

On riding a fortnight ago through the now noted Woolstone Farm, where splendid crops of corn may be seen on land which has been continuously under cereal crops for seventeen years, I was led to the consideration of what the clay soils of England could be made to do under steam culture, and I thought that if by the mighty agency of steam we might all be enabled to keep our land clean and crop as heavily, without injury to the soil, the problem of how this great nation, with its constantly increasing population, is to be fed, would be near to its solution.

For fourteen years I have been a disciple of Mr Smith, but he has beaten us all hollow, for the simple reason that he has been more thorough. I confess that I have been afraid to go the lengths he has, and furthermore, I could not do so without a fresh arrangement with my landlord. Judging, however, by the results, I see no reason why either he or I should fear any longer.

If Mr Smith can grow good crops continuously on the same land with little or no manure, without injury to the soil, why should not other people be able to do the same thing? The great yields at Tiptree, Mr Mechi tells us, are produced by the dung of highly fed animals, irrigation, and other accessories. At Woolstone, on the contrary, scarcely any stock has been kept, but the straw, after thrashing has been thrown into a long heap of 100 yards or so to rot down. This, with latterly a little superphosphate, has been the only manure used, and yet each year the crops have been apparently better than the last, and this season I think I may venture to say that they surpass any that have ever grown on the same land since it was created earth.

It is no part of my purpose to make a comparison between the Woolstone and other steam tackle. My purpose is to draw attention to the extraordinary results where steam culture is persistently and continuously applied, and to tell others who occupy clay lands how they may help themselves to the treasures which they contain. Many of the so-called poor clays are not so naturally, they are made so by faulty manipulation. No greater proof in point can be adduced than the land purchased in 1869 by Mr Smith, and which now forms a part of the Woolstone Farm. Many who have visited the spot will doubtless remember the contrast which they could hardly fail to make of the crops on one side of the fence and those on the other. But in the short space of time since it has fallen into the Woolstone man's hands, deep drainage and deep cultivation have done their mighty work, and the change is certainly marvellous.

Some portion of the farm which I occupy is of much the same character, but, if anything, a little better. During the wet harvest of 1866, in the course of their inspection of the steam cultivated farms of England, I was honoured with a visit by two of the Royal Agricultural Society's Commissioners. On shewing them a portion of this land, which was being broken up for vetches, one of them said he would rather go to plough on his land at 12s. a-week than occupy it. The other said that he would not farm it if it was his own freehold, and they wound up by asking me if I paid over 5s. an acre for it. On telling them that I paid nearly six times as much, they paid me the compliment of saying I was a very clever fellow if I managed to live off it. Yet on this land, with the help of steam, I have managed to grow very tolerable crops, and, I am thankful to say, lived pretty well too.

The average yield of all produce grown on

n generally has increased considerably steam culture; but, unlike Mr Smith, grow corn crops on three-fifths of n, the remaining two-fifths being under crops.

ie present time, on land which cannot sed as root land, I have as good a

plant of mangolds, swedes, and turnips as can be found in England.

I cannot do better than close my letter with saying to all who are sufficiently interested in the question of what the clay lands of England may be made to do, let them go to Woolstone and see.

THE CHILI SALTPETRE DEPOSITS OF PERU.

avelling eastward through Peru, from the sea to the Cordilleras, on the 20th of south latitude, seven zones are , the third of which, the Pampa of algal, and the fifth, Serrania Alta, or the hain (Upper Peru, or Bolivia), are ex- for saltpetre. The treeless Pampa, a somewhat depressed in the centre, has scanty vegetation, and the only thing grows there is a single variety of lgrass (mendicago); the cultivation of is attended with difficulty, on ac- f the large proportion of common salt, nd saltpetre in the soil. It serves in the support of the beasts of burden r transporting to the coast the salts tallic minerals found here. In the f the Pampa is a large deposit of bo- ces of which weigh on an average from 100 grimmes; soda saltpetre is found borders of Pampa and Serrania, but

distant from the sea. On the slope of the Cordilleras, salt is nd in small quantities; but in Upper here frequent rains wash it together at lakes, there are large quantities of : saltpetre mines consist of different The surface of the ground is com- silicates, sandstone, and pieces of lime. th of from 8 to 16 inches, very regular re usually found, which sparkle with of very small microscopic crystals; a below this, which is of rocky hard- nsists principally of common salt, ttle chloride of potassium and soda. , mixed with earth and pieces of

of silicates and carbonates, and has a thick- ness of 20 to 25 inches. Beneath this crust is the pure soda saltpetre, in more or less perfect crystals, from 20 to 40 inches long and 3 to 7 feet in diameter. Guano is sel- dom found there, and only in small quanti- ties; and it always occurs just below a stratum of salt. It is not in a powder, like that from the Chincha Islands, but adheres together, and is of a brown colour, contain- ing the bones and remains of birds and insects, and has an ammoniacal smell.

The chloride of sodium and lime present furnish mineral constituents required for the formation of the saltpetre. According to Thiercelin, the guano furnishes the nitrogen; but since the guano is always found below the salt crust, Koenig is compelled to refer the nitrogen to some other nitrogenous or- ganic bodies, from whose decomposition am- monia is formed, and this in turn is con- verted by the action of the air and organic bases into nitric acid. Besides the three substances named, all the conditions favour- able to the formation of saltpetre are found in that neighbourhood, namely, a pure dry atmosphere, absence of rain to wash away the saltpetre when formed, and the regular night fogs. The latter, leaving the salt un- dissolved, dissolve the saltpetre, and filter it through this stratum, under which it crystal- lizes.

The search for saltpetre is conducted thus: —The workman recognizes its presence by certain undulatory elevations of the ground, and numerous lumps of lime and disinte-

grated sandstone. He bores a hole some 12 to 18 inches in diameter, going down till the mineral is plainly visible. When the lowest layer is reached, the hole is widened to about 3 feet, filled with charcoal and sulphur and fired. The explosion breaks and tears up the ground for twice that distance around, and then properly begins the bringing up of saltpetre. The crude article varies considerably in compactness, colour and quality, and is named accordingly. The so-called sulphuret, which owes its name to its mode of manufacture, is the purest. The porous, earthy, and the congealed are different in quality. If the raw product contains less than 50 per cent., the mine is abandoned as not worth working; a yield of 70 to 80 per cent. is exceptionally good. The raw material is transported on pack animals or waggons to the factory, where it is refined in

two different ways. One method is to break it up in pieces and put it in an iron kettle half full of water, which is then heated over a fire for an hour, the insoluble matter removed and a fresh quantity of raw material added until the solution is saturated. The clear solution is run off into crystallizing vessels, the crystals collected when formed, and allowed to dry in the sacks in which it is shipped. In the second method, steam heat is employed; the crude material is put in perforated iron baskets and suspended in boiling water, and the process repeated until the liquor is saturated. The saltpetre prepared in this way contains less than 1 per cent. of common salt, while that obtained by the former method contains upward of 2 per cent. Large quantities of iodine are annually reclaimed from the mother liquors of the saltpetre works of South America.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

NOTWITHSTANDING the high price of meat in this country, our receipts of cattle from abroad are gradually falling off. From the Trade and Navigation Accounts for the month and six months ended June, we notice that our imports of cattle during the month—oxen, bulls, and cows, together—were only 10,846—less than half the number received in the corresponding period of last year, when we imported 22,400. In the six months just ended, the decrease—

| Month | 1890 | 1891 |
|-----------|--------|--------|
| June | 10,846 | 22,400 |
| July | 11,200 | 23,500 |
| August | 12,500 | 24,000 |
| September | 13,000 | 25,000 |
| October | 14,000 | 26,000 |
| November | 15,000 | 27,000 |
| December | 16,000 | 28,000 |
| January | 17,000 | 29,000 |
| February | 18,000 | 30,000 |
| March | 19,000 | 31,000 |
| April | 20,000 | 32,000 |
| May | 21,000 | 33,000 |
| June | 22,400 | 34,000 |

The above figures are taken from the monthly returns of the Customs, and are not corrected for the small number of cattle imported and exported by the colonies of cattle.

According to the ordinary law of supply and demand, we ought to have had, under the circumstances of scarcity and dearth at home, a much larger quantity of foreign cattle than we ever had. All that come find a ready and a good market. Two things occur to us; and they are these, either that the restrictions are too stringent, or that the meat-consuming population in foreign countries are gradually becoming more numerous. With regard to the restrictions, much caution is necessary, but we are glad to notice that some latitude has been allowed, so far as Schleswig-Holstein animals are concerned. Without sheep recently received from Tonning—dear as the cotton were, the prices would have been higher. About one-third of the sheep for the market have been lately shipped from that port. Taking the total number of foreigners from all parts, we find that more than one-half of the market supply sometimes come from over seas, and considerably more than half of the sheep. Were these

importations to cease our tables would be but scantily furnished with butcher meat. Whoever can hit upon a plan to increase our home stock, and so diminish prices, will deserve even more gratitude at the hands of his country than the benefactor who made two blades of grass grow where only one sprang up before.

The amount of money we paid for bacon up to the end of June, was £2,463,027, as against £11,339,651. Our exports of beef, salted and fresh, or slightly salted, were less—the cost this year being £270,731, as against £447,183. Hams were in very much larger demand, the imports in the first six months of this year, being valued at £226,990, while in the corresponding term of last year they only came to £94,269. For meat not enumerated in the above headings, we disbursed £508,571, to contrast with £254,837 in the like period of 1871. The imports of pork were not so extensive as in the first six months of last year, the sum we had paid up to the end of the month just passed being £335,044, to compare with £578,880. For poultry and game we had to account for about £14,000 more than last year, viz., £75,328, instead of £61,519. For live stock and dead meat, together, the foreigner took out of the British pocket the neat little sum of £5,566,832, which was nearly £750,000 more than in the first six months of 1871.

Regarding eggs, the product of a sadly neglected department of live stock husbandry in this country, the cry is still they come in overflowing quantities. Up to the end of June last year we received 1,825,458, this year 2,744,127, and the respective costs were £665,417 and £1,073,972. Butter was imported in slightly smaller quantity, and so likewise cheese, which would seem to shew that we are improving upon our dairy practice at home. The amount we paid for the former commodity was £2,918,348, and for the latter £668,615, the total sum expended upon meat and dairy produce reached £10,227,767, a large proportion of which, under better management, might go into the pockets of the farmers of this country.

Coming now to corn, we find slightly increased imports of wheat, both in the month

and six months. Barley was imported much more freely in both periods; oats were received in smaller quantities during the month, but the returns were much larger in the half year. Peas reached us in greater quantities in the month, but not so freely in the six; beans came in more plentifully in both periods, and so also Indian corn; but wheat meal, while shewing an augmentation in the month, fell off in the longer term. The amount of money we expended on corn during the first half of this year has been upwards of £4,000,000 sterling in excess of last, the exact figures being £19,372,483, as against £15,369,903. Mr Mechi will tell us that this is more than we are justified in paying away with so much of our own land lying uncultivated, and he has reason on his side.

The tables subjoined give the quantities of the several kinds of cereals, &c., the names of the countries from whence they came, and the values for the past half year, as compared with the corresponding period of 1871:—

| QUANTITIES. | | |
|--|---|---|
| | Six Months ended June 30, 1871. Cwt. | Six Months ended June 30, 1872. Cwt. |
| Wheat. | | |
| Russia..... | 5,906,640 | 7,908,329 |
| Denmark | 14,340 | 98,885 |
| Germany | 1,327,310 | 1,649,304 |
| France | 38,246 | 129,058 |
| Austrian Territories ... | 191,546 | 5,762 |
| Turkey, Wallachia, } and Moldavia | 573,538 | 489,164 |
| Egypt..... | 35,611 | 1,161,564 |
| United States | 5,619,861 | 2,930,973 |
| Chili | 136,457 | 664,982 |
| British North America | 734,826 | 162,022 |
| Other Countries | 175,183 | 436,799 |
| Total..... | 14,753,558 | 15,636,842 |
| VALUE. | | |
| Russia..... | £3,377,868 | £4,568,671 |
| Denmark | 9,370 | 64,852 |
| Germany | 878,761 | 1,093,390 |
| France | 21,248 | 76,760 |
| Austrian Territories ... | 119,229 | 3,446 |
| Turkey, Wallachia, } and Moldavia | 308,230 | 260,896 |
| Egypt..... | 19,598 | 586,249 |
| United States | 3,365,300 | 1,884,529 |
| Chili | 92,132 | 437,992 |
| British North America | 417,729 | 107,794 |
| Other Countries | 108,271 | 285,584 |
| Total | £8,717,736 | £9,370,163 |

The Country Gentleman's Magazine

QUANTITIES.

| | Six Months ended June 30, 1871. Cwt. | Six Months ended June 30, 1872. Cwt. |
|------------------------------|---|---|
| Barley..... | 3,412,248 | 7,036,697 |
| Oats | 3,898,586 | 5,632,269 |
| Peas | 473,829 | 454,855 |
| Beans | 1,122,508 | 1,622,952 |
| Indian corn or Maize..... | 5,422,705 | 8,181,066 |

VALUE.

| | | |
|------------------------------|-------------------|-------------------|
| Barley..... | £1,382,765 | £2,729,028 |
| Oats | 1,549,724 | 2,046,183 |
| Peas | 210,912 | 196,528 |
| Beans | 512,592 | 648,519 |
| Indian corn or Maize..... | 2,157,011 | 3,052,379 |
| Total..... | £5,813,004 | £8,672,637 |

QUANTITIES.

| | Six Months ended June 30, 1871. Cwt. | Six Months ended June 30, 1872. Cwt. |
|-----------------------|---|---|
| Wheat Meal and Flour. | | |
| Germany | 446,788 | 487,676 |
| France | 1,224 | 233,285 |
| United States | 1,156,672 | 208,428 |
| British North America | 94,416 | 39,385 |
| Other Countries | 415,065 | 477,310 |
| Total | 2,114,165 | 1,446,084 |

VALUE.

| | | |
|-----------------------|-------------------|-------------------|
| Germany | £415,644 | £449,485 |
| France | 828 | 216,541 |
| United States | 943,895 | 160,413 |
| British North America | 69,358 | 35,151 |
| Other Countries | 409,440 | 468,093 |
| Total | £1,838,365 | £1,329,683 |

During the six months ended June 30, 1871, the total quantity of wheat meal and flour imported into Great Britain was 2,114,165 cwt., valued at £1,838,365; and during the six months ended June 30, 1872, the total quantity of wheat meal and flour imported into Great Britain was 1,446,084 cwt., valued at £1,329,683.

were in slightly less demand during the month, but in the half-year there was an increase, the sum we paid for these fertilizers being in the half year £319,084, as against £288,873. Nitrate of soda has largely increased during the month, and perceptibly so in the half-year. This commodity is rapidly and deservedly rising in public estimation. The amount we paid for it this year, was £734,542, as against £626,775.

We received about three times as many potatoes from abroad this year as we did last, the cost being £254,595, instead of £81,521. Clover and grass seeds were in diminished supply in both periods; flax seed shewed a decrease in the month, but an increase in the six, its value was £1,523,315. Cottonseed cost us little more than in the first half of 1871, viz., £1,066,244. In rapeseed there was a great falling off in both terms.

Owing to a deficiency in the Australian imports, wool does not figure so largely as in the corresponding month of 1871, but in the half year the receipts were larger than in the like period of last. The following tables shew the quantities and the values for the past six months:—

QUANTITIES.

| | Six Months ended June 30, 1871. lb. | Six Months ended June 30, 1872. lb. |
|--------------------------|--|--|
| Wool, Sheep, and Lambs. | | |
| From Countries in Europe | 14,157,217 | 16,633,751 |
| „ British Possessions | | |
| in South Africa .. | 17,042,508 | 17,375,826 |
| „ British India | 11,349,841 | 12,309,802 |
| „ Australia..... | 134,735,288 | 140,587,228 |
| „ Other Countries..... | 14,276,535 | 20,291,949 |
| Total | 191,561,389 | 207,198,556 |

| | | |
|------------------------|--------------------|--------------------|
| Quantities in Europe | £739,644 | £976,520 |
| „ British Possessions | | |
| in South Africa .. | 895,783 | 1,104,425 |
| „ British India | 386,930 | 539,667 |
| „ Australia..... | 7,833,611 | 8,750,643 |
| „ Other Countries..... | 492,160 | 908,744 |
| Total | £10,348,128 | £12,279,999 |

The imports of purely agricultural commodities amount to comparatively little, and so

ter and cheese are concerned is a good sign, seeing that as we are sending away nor bringing in so much, are consuming more at home. Our returns for butter and cheese in the six months amounted to £142,992 and respectively. The export of horses is very limited this year compared with last. Up to the end of the year we sent away was 1691, to compare with 1616. The value was £92,633; in 1871, 54,282, which shews a difference of 20 per head in favour of the sellers. The horses averaged £55, last year.

The following tables shew the export and import of wool, and the places to which the wool was sent:—

| QUANTITIES. | | |
|-----------------------------|---------------------------------|---------------------------------|
| | Six Months ended June 30, 1871. | Six Months ended June 30, 1872. |
| Wool, Sheep, and Lambs. lb. | lb. | lb. |
| To Germany | 1,189,484 | 973,722 |
| „ Belgium | 1,066,147 | 817,979 |
| „ France | 1,008,090 | 441,292 |
| „ United States | 604,086 | 1,386,231 |
| „ Other Countries ... | 830,771 | 592,039 |
| Total | 4,698,578 | 4,211,263 |
| VALUE. | | |
| To Germany | £86,617 | £81,879 |
| „ Belgium | 72,065 | 71,330 |
| „ France | 82,506 | 36,310 |
| „ United States | 33,009 | 101,012 |
| „ Other Countries ... | 64,844 | 56,537 |
| Total | £339,041 | £347,068 |

AGRICULTURAL NOTES.

By J. J. MECHI.

ING from her sleep.—What a stir last in agriculture! Beet-sugar steam-cultivating companies, land reclamation companies, land drainage companies, agricultural companies, and nobody knows what it forgetting class schools, agricultural societies, tenant-right and labourers' associations.

All new in my time, and some of them in my early letters some years ago. London is coming into the country, and is spending its capital, either in pleasure or profit, or both, and seems also to be covering us with bricks and mortar. It will be worth more money as soon as the Eastern Railway and the Metropolitan Railway shake hands at Broad Street. People will be building and living in the country, and it is not a flat country, but a country with many beautiful and extensive views, and nice hills, valleys, and rivers. People wont to be identified mentally with the country, and flatness—such judgments are formed on the water abutting on

its extensive coast line, and fostered by those antique farmers who insisted that the stiff clays could not be drained; but we know, and I knew thirty years ago, that they would drain, if we put in pipes, and so become healthy, instead of unhealthy, for man, beast, and plant. The ancient prejudice having fast given way, we may be now soon approached. Antiquarian unbelief is gradually disappearing, and is being succeeded by intelligent considerations as to whether the new moves pay? Of course they do, thanks to steam-power.

Cow farming is going out, in fact has died out in this neighbourhood, where once there was an abundance of them. Why is this? Corn farming has come in, and rents have increased, and Mr Mechi's false idea about poor grass land has proved to be a correct one. Poor grass land and no cultivation will not pay "improved" rents and rates and taxes, although cultivation, corn, roots, and artificial grasses will do so. Farmers have gradually realized the fact (predicted by chemistry) that cow manure is poor, and will

not force good corn and root crops like that from fattening animals. No doubt when we breed either cows or sheep we must "go in" for a heavy consumption of cake and beans that did not grow on our land, and we must supplement our manure by guano or superphosphate of lime. The right thing is to breed, feed, and fatten, and thus grow plenty of meat and corn concurrently. That is my practice with sheep. Selling lean stock means impoverishing the farm, unless much artificial food and manure are used. I said to my bricklayer to-day (age sixty), "Do you remember old Mr and Mrs Sadler, and the old lath-and-plaster buildings?" "Yes," he said, "for as a boy I had to fetch skimmed milk for the brick-makers, at a $\frac{1}{4}$ d. a-pint; and I had to clean the halfpence as I went down, for the old lady would not take the coppers unless the heads and tails were distinctly visible."

Walls of wheat v. walls of hedges.—The conclusion I have arrived at is "for the plaintiff." For twenty-eight years, as I approach my home by the winding back road, formerly shut in by huge fences with trees and ditches, but now fringed by tall wheat

crops, I ask myself why were robberies and useless ditches there, depriving the farmer of their food and the farmer of his profits? They are rendered unnecessary by modern iron hurdles on wheels for enclosing; thus giving up the roaming-at-large system. Like Mr Prout, I have gained a quantity of acres of available land—almost like a garden. Where fences were required, my worthy friend Garrett fitted me with a lot of strained wire, no thicker than a tobacco pipe, under 2 inches. After twenty-eight years' wear it appears quite juvenile, and likely to be useful to centenarians. They are bullock-proof, almost invisible, obstructing no view, having no greedy fangs. We may now open up our minds to see a new style of land. It must come, as rents become higher and human food more in demand. In fact, I shall take a more unobstructed view of Irish agriculture in more than one sense.

Mr Mechi, but does it pay? Yes, it does.

Labourers' wages in this neighbourhood have been raised to 13s. (including money, 1s. or beer), and for ploughmen and stockmen, 14s. 6d. This refers to able-bodied men.

IMPEDIMENTS TO AGRICULTURAL PROGRESS.

By Mr JOHN RIDLEY.*

THE subject we have for discussion is the Impediments to the Progress of Agriculture. Physical, social, and financial. In this subject more especially the physical and social impediments are of great importance. The physical impediments are those which are inherent in the soil and climate, and the social impediments are those which are the result of human action. The financial impediments are those which are the result of the state of the money market. The physical impediments are of a special nature, and are unlike those to which other employments are subjected. It is further removed from the control of the individual, and to overcome those impediments requires patience combined with well-timed action, ever bearing in mind the necessity of assisting Nature. One of the most serious of these is the unsatisfactory condition of the farm workmen, who are said to be the cause of the stagnation of the industry. Although in my humble opinion this unsatisfactory condition has been exaggerated, it is no doubt desirable to improve their position as to work and pay, for cases are constantly occurring where men prefer slovenly

once manifest that the physical impediments of farming are of a special nature, and unlike those to which other employments are subjected. It is further removed from the control of the individual, and to overcome those impediments requires patience combined with well-timed action, ever bearing in mind the necessity of assisting Nature. One of the most serious of these is the unsatisfactory condition of the farm workmen, who are said to be the cause of the stagnation of the industry. Although in my humble opinion this unsatisfactory condition has been exaggerated, it is no doubt desirable to improve their position as to work and pay, for cases are constantly occurring where men prefer slovenly

minimal low pay (though really high) to a style of work and proportionate high wages. As a help to this desired improvement has been proposed by some that the men should, in addition to their earnings, each have a small farm of 3 or 4 acres, if possible, of fertile land. On this subject I wish to say a few words with deference, because the plan is adopted by some for whom we all have a respect, and with whom we agree in the object to further the well-being of our fellow-countrymen, though differing in the mode of obtaining the object. This plan, however, could not be carried out in certain localities where the nature of the land was favourable, and if carried out on a large scale it would cause a great financial difficulty in providing capital for small farms, as, on a moderate calculation, if a farm of 400 acres requires £8000 in capital, a farm of 4 acres would want £2000; and this extra money would have to come from other sources than that now employed in farming.

GENERAL IMPEDIMENTS TO AGRICULTURE.

Among the social impediments to agriculture may be reckoned these: some landed estates being used more or less for other purposes, such as sporting, farming being a secondary consideration, or social position and political influence being most thought of; on other estates the cultivators are so restrained by agreements (the reverse of liberal) that they amount to a preventive of good husbandry. Another hindrance is, many persons are unduly hampered by settlements which cause the owner in possession to be only an annuitant or life holder, and as having but little inducement to improve the property. When an estate is hampered both by settlements as well as settlement, the evil is increased.

FINANCIAL IMPEDIMENTS.

The financial impediments to progress are various. To begin with: the returns or profits from farming are perhaps the most various and uncertain of any regular occupation. There are many farms carried on for years without profit, such as in the case of well-to-do

families who do not like to give up a place which may have been for generations occupied or owned by their ancestors. Other people continue to occupy land for the sake of country sporting life, and from various causes a considerable proportion of land is farmed for other purposes than simply to make an income, and thus the acreage is less for those whose object it is to get a living by farming. One great requisite is, how to apply more capital to the land with judicious security for reaping the benefit of the same; and with all our skill, capital, and industry, failure often follows from causes over which we have no control. In no other occupation does a man put himself and his property into the power of another so much as a tenant-farmer who is without a long lease or covenants for unexhausted improvements, and this has a tendency to drive active-minded men into mercantile or professional pursuits. Perhaps it will not be out of place to mention here the opinion of a man who, both owning and farming, is well qualified to give a good one, though it may seem startling to us. He said the day was coming, or would come, when in England no farming would pay, but such high farming requiring so large a capital that no one would expend it on another's land, except on leases answering in some respects to building leases common in towns, and for a long term of years. To obviate the difficulty caused by the want of security of capital applied to land, much may be done by farmers themselves, for a large proportion of owners are or would be willing to come to terms with tenants desirous of improving their farms; a liberal spirit on the one side would, it is to be hoped, be met with the like on the other side. But on estates where the owner does not or cannot make the outlay, the law should protect the tenant who invests his own money in improvement by giving him a legal claim upon the estate for unexhausted improvements, so that when he leaves or dies he or his family receives what justly belongs to them. In Ireland there is that legal Tenant-Right, and it is equally required in all the British Islands.

Foremost in improvements are draining and farm buildings, and although this subject may belong more properly to a farmers' club, perhaps I may be allowed to express an opinion on the want of farm buildings, draining not being so much required in this county as in many others. In conclusion, I move the following resolution, viz.,

"That the Hampshire Chamber of Agriculture be requested to consider that the progress of agriculture is impeded by the want of compensation for unexploited improvements, and by the present system of settlement of landed estates in this county which tends to limit the application of capital to the permanent improvement of such property."

CONCRETE BUILDING ON THE FARM.

IN these days of agitation regarding the position and comfort of farm-servants and labourers in general (says the *Aberdeen Journal*), and in which questions of an economic character largely mingle, a system of building is coming into use which is probably destined to effect a considerable reformation, if not a revolution, in the social habits of a considerable portion of the labouring population. It is now very generally admitted that the erection of dwelling-houses upon the farm is not only highly convenient in a social point of view, but lies very much in a line with the best interests both of the employer of labour and those who are employed. Hitherto, one great obstacle to the adoption of a plan which has many self-evident advantages has been the financial aspect of the question. In many cases, already, it is true, proprietors have, much to their credit, inaugurated a good movement by erecting upon their properties what are termed model cottages, but, as a general rule, the earnings of servants, for whose benefit they are intended, have been inadequate to pay the small rent attached to their occupancy, or if they have been sufficient, the servants have been left with so small a margin that they have been obliged to forego necessities and comforts that they would otherwise have enjoyed. The system to which we have alluded as likely to affect this question of accommodation on the farm for agricultural labourers, on account of its economy, is that of erecting dwelling-houses of the material

known as concrete. Of course a much question here enters as to how far the system may affect a revolution in the building in general, once its merits have been tested; and still further, and as a consequence, a question will probably arise as to its effects on skilled labour in the building trade, which is, in a large measure, superseded by the new process. That, and such questions, however, we do not here intend to enter into, but would rather seek to draw attention to the fact that two cottages of concrete in process of erection are on the property of Mr Lumsden of Pitcaple, that gentleman being one of the directors of a concrete company in London. The cottages are intended for the accommodation of servants on the estate.

The whole process of building houses of concrete is so exceedingly simple that the employment of skilled labour is quite unnecessary, and indeed the four labourers who were employed in the construction of the cottages referred to had never seen anything of the kind before, and yet they performed their allotted work without the slightest difficulty. A foundation having been laid, a double framework of wood, or panelling, 12 inches apart and 18 inches high, is placed above the foundations round the entire building, forming a kind of box. This panelling consists of pieces of wood, varying in breadth from 3 or 4 inches to over 1 foot, and is secured by a bead on the upper edge having an aperture by which the pieces are slid on to an

rod. Being thus telescopic in construction, the pieces of wood can be lengthened or shortened according to the extent of the building. At intervals between the panels are placed upright bars, called separating posts, several feet high, through which the iron rods supporting the panels pass and are secured. At equal distances of 18 inches, ascending upwards, there are apertures in the posts for the insertion of the iron rods, and the panelling round the entire structure can be raised with great ease as the building advances. When operations are to be commenced, a quantity of packing, which may consist of rough stones of any shape, the more ragged the better, which forms the first layer of the building, is thrown in, care being taken to keep the packing 1 inch from the face of the work, so that it may not shew through it. When the 18 inches of packing are filled up, the concrete, which is in a semi-liquid state, like mud, is poured into the box, and percolates down through the stones, thoroughly filling all cavities, and binding the stones and rubble together so tightly that the whole forms one solid mass. For a day the portion of wall thus made lies encased within the panelling. By that time it has become quite dry, and the panelling or frame is taken off and lifted up other 18 inches, the bottom of the frame resting where the top was before. Thus another box is formed above the piece of finished wall, and identically the same process which we have described is repeated, stones and rubble being thrown in, and the liquid cement being poured over them. In this way 18 inches of building are finished each day if the weather be good, so that in the course of a week, the walls of a cottage 8 or 9 feet high are strongly and firmly built.

When the panelling is screwed together to the separating posts, it is so mathematically exact, owing to its careful structure, that the wall is built as straight as if tested with a plumb line. Indeed, it cannot fail to be so, and it is interesting to note that the whole building is finished without the aid of a plumb line, which is quite unnecessary.

A noteworthy feature in connexion with the building of these concrete houses is that the

usual cumbrous and often dangerous scaffoldings which are used in erecting ordinary buildings is superseded by a much better, more secure, and much less unwieldy arrangement, by which ropes are entirely dispensed with. Little hollow iron tubes, called cores, are placed in the walls, through which iron rods are inserted, connected with brackets, which are securely attached to the wall, being firmly screwed through the building with nuts. The brackets are just similar in form to supports used for shelving, and on the top of the brackets are laid the planks for the scaffolding, forming altogether a neat and strong support.

The two cottages, which are built as one, are 32 feet in length, by 22 feet, and 8 feet high. In each cottage there are three rooms, those in the front being about 12 feet square, and the back rooms measuring about 7 feet by 12. The cottages are lighted by two windows in front, and four in the back. The flooring is of concrete, which, being thoroughly impervious to moisture, makes the apartments very dry and comfortable. It is intended to have the roof built in the ordinary way with rafters and slating, but it is not uncommon for concrete to be used as a roofing material, for which purpose it answers very well. The outside walls, when built, are finished with a coating of concrete, about a $\frac{1}{4}$ of an inch thick, a little finer in the quality than that used for the ordinary building, which gives a smooth finished appearance to the structure. No supports are requisite for the lintels of the doors or windows, because after the concrete is hardened, it is stronger than any support of wood or stone. When the building is in progress, spaces are left for the joists, which are temporarily filled with sand, which is easily removable at any time with a trowel. The spaces for the joists are made, alternately, 3 inches and 6 inches in depth on each side of the building, which diminishes the pressure on the walls considerably.

Houses finished in the way we have described are much cheaper than those built in the ordinary way, the saving being from 35 to 40 per cent. The buildings, at the same

time, are more comfortable, because being impervious to moisture and heat, they are warm and dry in winter, and cool during summer. The rooms can be papered over the bare walls, no lath or plaster being required, though a coating of plaster will in no way affect the concrete, if it should be preferred.

An important element, of course, in the process of building is the concrete or cement itself. It is burnt down from stone somewhat in the same way as lime, but, of course, is of an entirely different nature. When the cement is to be used it is mixed with rough sand, generally for ordinary purposes in the

proportion of eight pailfuls of sand to one of cement. The two are mixed simply in the ordinary way, water being poured over the sand and cement until they are in a semi-liquid state. When the sand is very sharp and shelly, the concrete can be made in the proportion of nine pailfuls of sand to one of cement; while in other cases, again, where the sand is of a soft inferior description, one pailful of cement is necessary to seven pailfuls of sand. The securing purity of cement thus becomes very necessary, but a London firm, Messrs Hilton & Anderson, gives a guarantee along with the cement of its strength and purity.

FARM COMPETITION IN ENGLAND.

INVESTMENTS in land, says the *Pall Mall Gazette*, yield a very moderate percentage as it is. Yet we can hardly help suspecting that the soil is actually over-rented, and that in the inevitable course of things landlords will be compelled to submit to a reduction. Excessive competition for farms must be forcing up rents unnaturally. A great Yorkshire farmer, giving his evidence the other day on the question of game preservation, incidentally stated a suggestive fact. He said that in practice in this matter of game no tenant could stipulate for restricting covenants in his lease; that the landlords knew that if one man objected to their conditions, there were plenty of others eager to accept them. It is evident that if competition is so keen as to compel farmers to keep silence in a matter on which they feel so strongly as the over-preservation of ground game, it must exert its influence on the rents they emulously offer. The truth is, the demand is on the increase while the supply is not. The farming class is prolific and elastic; the land to be farmed is pretty nearly a fixed quantity, for the margin left for reclamation is not very appreciable. Farmers shew the attachment to districts that cats do for places.

Their natures are strongly conservative; with some reason they shrink from changing the system of cultivation they have been bred to, and leaving the neighbourhood of the markets with which they are hereditarily familiar. A man accustomed to raise hops and fruit in the suburban districts of Kent, or cabbages and carrots in Essex, who is always shooting truck-loads of town manure over his soil, or flooding it with Barking Creek sewage, would be utterly *depayse* on the starving soil of Dorsetshire. Conceive the shock of mental paralysis that would strike the Dorset man were he transported to a holding among the high farming of the Lothians; while in most instances the caution of small agricultural capitalists would be simply scandalized by the suggestion of emigration to the colonies. You might as well suggest Erie stock as an eligible investment to a trustee of the old school. So whenever a farm appears in the market, men from the district swarm round it, and their competition is stimulated by the presence of that growing class of reckless fancy farmers, who are helping to raise rents generally. Landlords in all parts of the country have been congratulating themselves on the

improvement of their property." The rumbling of tenants repenting at gains contracted in haste, has been self heard simultaneously. The of farmers is of course proverbial, and facts seem to argue that there is a real foundation for it in this case. As a rule, are loath to sell up. Men have been in difficulties than is counted for by successive summers of unacted drought, and some rather poor harvests. Now the general strikes of agricultural labourers introduce a new element. The labourers have often a good reason on their side. Advances have been conceded in many instances, and will doubtless be conceded in others. If the tenant-farmers have to pay higher prices for labour, where they have a struggle in any case to make the two ends meet, the landlord must suffer in the long run, and the rents of land must recede. It may be a question how far the collateral pleasures and profits of landowning will reconcile a man with capital to investing for it a return that relatively is absurdly small. He may remember, however, in making his calculations that by sinking his savings in the soil he insures himself against seeing them swept away in one of our decennial panics.

THE ALLOTMENT SYSTEM.

By SIR BALDWIN LEIGHTON.*

IN attempting to explain how, in certain places, the condition of the peasantry has been improved by allowing him a small share in the land on which he has to pay for the use of allotments and cowland, it is allowable to state two facts which, if they be accepted or rejected, whether contradicted to-day and acquiesced to-morrow, or otherwise, are nevertheless the result of distinct practical experience. That without any very considerable alteration in wages, any such rise, if it be conceded, as would upset the economy of the cultivation of the land, the effect of the labourer can be greatly improved if his income is increased, his whole condition ameliorated by his own exertion on the land—which exertion at the same time, by acting upon the quality of his soil, enhances his value as a workman, increases his contentment and attachment to the soil, and eventually exterminates pauperism—so that the solution of this problem will not be by a mere direct rise in wages, but by means more fundamental, more drastic, and more human. Secondly—That although much good may ensue from meeting and conference in imparting information and correcting fallacy, yet this matter will not be settled by speeches or congresses, or even by committees appointed thereat. It will be settled by landlords, farmers, labourers and others down in their several districts, on every estate and farm, by personal devotion and practical experiment rather than by canvas and talk, or what a great writer describes as "swarmery." But, whether these propositions be conceded or not, it is of the last importance that at a meeting like this, practical truth and practical suggestion should be heard as to the best means of improving the standard of the worst by the example of the better. If it be conceded, as it must, that the position of the farm labourer in some parts is one of comparative comfort, that is to say compared with the unskilled labourer in towns and elsewhere, it must also be asserted that his position in other parts of the country, but more especially in the south of England, is capable of and does require great amelioration.

Before the National Labourers' Congress at

And first by way of garden allotments. In some parts of England it is the custom to attach to every cottage a considerable and sufficient garden of say $\frac{1}{2}$ or $\frac{1}{3}$ of an acre. This is chiefly the case where the cottages are scattered and not grouped together in villages, but there are many more districts where the garden attached to a cottage is miserably insufficient. Now, it is in the power of every landlord and every farmer to remedy this state of things, at no perceptible loss to himself, by letting off in portions of say $\frac{1}{4}$ of an acre, some field or part of a field. In has practically been done in many counties in England, and wherever judiciously managed it has been found to work well, and the plot of ground has come to be highly prized by the labourers. The rent paid is considerably higher than the farmer can afford, and experience shews that they are willing to pay even an exorbitant rent for land at an inconvenient distance, so greatly do they prize the advantage. Some approach to such an arrangement is made in many places by a grant of potato ground, cultivated by and rented from the farmer; but this is in no wise equal to the allotment on which a labourer can work and invest his spare time, coming by degrees to take a permanent personal interest in it. The produce of the ground, generally potatoes and grain, makes a considerable addition to his income, but the human aspect of the system and the contentment produced by the attachment and independence of the labourer are the most striking in the arrangement. In some parts of the country the labourer has a small plot of ground attached to his cottage, but this is not sufficient to enable him to support his family, and he is obliged to go to the workhouse for relief. In some parts of the country the labourer has a small plot of ground attached to his cottage, but this is not sufficient to enable him to support his family, and he is obliged to go to the workhouse for relief.

Then to some few select and thrifty labourers, and, under strict precautions, a further boon can be accorded in the grant of a few acres of grass to keep a cow. In some parts of Northumberland it is the habit to allow the run of a cow to some or all of the labourers; in the Agricultural Commissions Report I find one case where a farmer had ten labourers, each of whom kept his cow on the farm. Besides being a source of considerable profit to the man, through the labour of his wife, it enables him to rear strong healthy children; and possibly to that cause may partly be attributed that fine type of agricultural labourer, that race of permanent giants there found, though something also must be due to nationality, and their superior education and thrift; but the elements are not so dissimilar but that conditions may gradually produce elsewhere like consequences, for it has been observed by competent judges, that this northern workman, though earning much higher wages than his southern neighbour is not an expensive labourer, but rather the contrary, as he does far more and better work.

Now concerning this allotment of land, as it has been found on an estate where many such places exist, that by holding out as prizes to those labourers who have saved money, who actually had an account in the Savings' Bank amassed by themselves, a considerable inducement was afforded to their habits, and opportunities for investment with a prospect of comparative comfort were held out which indirectly has had a

ost beneficial effect on all the neighbour-
ood. This state of things is adverted to in
e Report of the Agricultural Commission
the assistant commissioner, Mr Edward
anhope, and such steps as the following,
irect and indirect, may be summarized as
ulting from the system, if it can be called.
Selection by means of thrift, of the best
bourers, re-acting upon the rest in the
neral promotion of provident habits. 2.
levation of the individual labourer and
e whole family by increased self-respect
d carefulness. 3. Supplementation of
ages by the labourer's own exertions at no
rceptible cost to landlord or farmer. 4.
omparative contentment and comfort, with
strong attachment to the place as a labourer.

Gradual extinction of pauperism and
providence, including drunkenness. And
om the experience acquired on this estate,
is probable that if, where such small tene-
ents existed, care was taken to utilize them,
prizes to the best and most thrifty of the
gricultural labourers, or even attaching them
estates or to a farm, or carving them out
f farms, great good might follow in opening
way and a prospect to the best men to rise.
landlord lately in this same county had
b-divided a small grazing farm of 2 acres
at was vacant among four agricultural
bourers on his estate who had saved money,
d other such opportunities would from time
time arise if they are sought. Then there
e two further facts bearing on the same
int. A gentleman farmer, cultivating his
n land, told me he had a bailiff or foreman,
whom he only paid 18s. a-week, but who
s worth half as much more, yet he never
ought of leaving him or asking for more
ges, and what was the secret of that? Why
e man had a small holding of 5 acres of
ss land under his employer. "That man,"
aid, "depend on it, will never leave you of
own accord." In another district, com-
ising coal and lead mines, as well as an
gricultural population, where some interest
s taken in the savings' bank's deposits, it
s discovered that whereas many miners
at is workers at the lead mines) put by
oney, there was hardly a single collier who

had a deposit. They were earning wages
equally high, and the fact seemed in-
comprehensible, till on examination it was
discovered that whereas most of the miners
had a patch of land and a cow, the colliers,
owing to the smoke or some other local cause,
hardly ever had that advantage, and no
doubt invested all their earnings in the pub-
lic-house. Now the same sort of results are
found to follow in other places by a similar
system of precaution, in allowing only thrifty
families to come on the land, and notably on
the estate of Mr Hope Johnson, in Dumfries-
shire, where, under the direction of his agent,
Mr Charles Stewart, the effect is thus de-
scribed by an eye-witness in a report pub-
lished by the Highland and Agricultural
Society:—"What we chiefly value in the sys-
tem is its marked effect in producing and
perpetuating an orderly, respectable, and
well-conditioned peasantry. The problem
which is generally looked upon as so difficult
of solution is here solved with eminent suc-
cess. It has been shewn to be quite practi-
cable to elevate the labouring man, not only
without burdening the farmer or the landlord,
but to the manifest benefit of both, to foster
small holdings without depressing agriculture
or retarding improvement, and to combine
permanence with progress." A similar sys-
tem with similar results obtains in North
Derbyshire, and is described in the Agricul-
tural Commissioners' Report.

THE ENCLOSURE COMMISSIONERS AND POOR- LAW PROHIBITORY TO ALLOTMENTS.

There are two other points not immedi-
ately within the scope of this paper, but bear-
ing on it sufficiently perhaps to be mentioned
here. 1. The prohibitory regulations of the
Enclosure Commissioners as to cottage build-
ing prevent money from being taken up by
landlords through the companies. If two or
three practical men were put on the Com-
mission, there need be no great difficulty
about cottage accommodation. 2. The ad-
ministration of Poor-law out-relief, which, in
some parts, by indirectly supplementing
wages, is in fact degrading, and lowering the
wages of the unskilled labourer. When both

employer and employed, as donor and recipients of out-relief look to the rates as a legitimate fund for indirectly and sometimes directly eking out wages, the effect cannot but be pernicious and demoralizing. For man, even the most depressed and degraded, is not a machine or an animal. If he have any intelligence whatever he must have movement, progress, and objects before him; he must have some practical motive and reason to be respectable, thrifty, energetic, careful, and the like. If he is to be of any account, of any real use to an employer or a farmer, he must have some other out-look and distraction than the beershop—some better prospect than the workhouse. The want of sympathy and intelligence sometimes displayed, especially about the southern counties, in the expression of the rural labourer, caused by the careless and pernicious—it would not be too much to say the atrocious administration of the Poor-law, as yet uncorrected by the Central Board—calls aloud for amendment and cure. There is one more point, not quite belonging to the subject of this paper, which is yet one of considerable moment to the agricultural interest. It is the answer to the question—is it possible to introduce into farming an industrial partnership, such as already obtains in manufactures? that is to say, by the farmer or employer giving, in addition to the weekly wages, other extra payments depending on his own profits. I venture to assert, speaking from practical knowledge, that something of the sort is possible and desirable, and would also be for the advantage of employer as well as employed. And I say so as one who dare not advance one word or statement that is not founded on tried practical experience.

THE following is a statement of the results of the experiment of the industrial partnership, as conducted by Mr. J. H. B. in the year 1861, in the county of Kent. The statement is taken from the report of the Committee of the Agricultural Society of Kent, and is published in the *Quarterly Review* for January 1862.

counts and partly owing to the effect of weather and seasons. It is left to every farmer for himself to weigh how best to put such a plan into practice. I am certain I am that every farmer who in days wishes to make farming profitable would do well to consider how to interest every labourer on his farm some in the profits of that farm. Some such means as these described it is in the power of farmers as well as lords to mend this matter—gradually prove the position of their labourers, at any very great cost or outlay. Let the opportunities of rising and improving condition. Let the best men feel that they are not dragged down to the treatment of the worst, and let all perceive that it depends on their own exertions whether they rise or not. But do not suppose from anything herein contained, that you have fallen down into a pauperised district, where exists a total disregard of the real welfare of the people, aggravated by a fatuous administration of the Poor-law, and with this other plan in your pocket, set all right in a day or in a year. You cannot. You cannot put such a district on a par with those where the results of a totally different system have left their permanent traces. I can commence the improvement at once, and perhaps the results of a few months will appear marvellous. A farmer employing say half-a-dozen labourers might, by apportioning 1 or 2 out of his farm, give each a $\frac{1}{4}$ or $\frac{1}{2}$ acre, which would probably be more profitable to the men than a considerable wages; and at the same time, he might give a prospect to any of his men who have saved sufficient money to give them a cow, or apportion another acre for a cow, or apportion another acre for a cow. By such means, the classification and payment by industrial partnerships, he might gain the quality of his labour and the quality of his labourer—meanwhile, attaching to the place more surely than by any other however devisable; and if his neighbour declined to follow his example, he

to demand the best men in the district. Let the landlords look to it also, and put an end to their inertness. Their personal direction and sympathy is not a little required down in the rural districts; and the mal-administra-

tion of the Poor-law is greatly their concern. To them is still the kingdom and the power; to them it may yet be the glory, as it is assuredly the duty and interest to come and help in this matter.

PRICE OF LAMB.

THE *rationale* of the following article, from *Land and Water*, with reference to the cheapness of lamb next year, is mixed with so many probabilities and contingencies, that we are afraid it would be ridiculous in either buyer or seller to upon the prediction. Besides, although the price of lamb has been, it is not altogether due to the scarcity in the market. There have been as many lambs in the market throughout the country as usual, and the prices have simply risen proportionately with those of other meat, and not exceptionally, as here it is apt to be made out. The price of lamb during the present season has been higher than it was ever before known, and whatever terrible anticipations may disturb the mental equilibrium of the families as regards the extravagant price of butchers' meat, there is little doubt that they may venture to promise favourably for the next seasons as regards the price of lamb, although during the present year lamb will be very much cheaper than now. Mutton and beef may perhaps be dearer yet, but this does not maintain a higher price for any length of time. In the case of stock, the Agricultural Returns shew a decrease, but there is no reason to believe that next year will show any increase, and then meat must be cheaper. Lamb, however, will most probably be cheaper next season; and this optimistic declaration is so positively asserted in the report of fulfilment, because, incongruous as it may appear, lamb is so awfully dear at present. Never was the price maintained so long at 1s. per lb. as it has been this year, and before has there been such a scarcity;

other years' lamb by this time has been as cheap, if not cheaper, than mutton. And why is this? It is because we have learned at last that it is a penny-wise-pound-foolish policy to kill the goose that lays the golden eggs. So our farmers, in many instances, are reserving their ewe lambs to form their breeding stock, and are holding the wethers back, thinking that on account of the high price of mutton, as full-grown wether sheep they will command more remunerative prices. For the past few years lambs have been forced upon the market in large quantities, in consequence of the sadly unfavourable prospects of the root and green crops, as well as because panic-stricken farmers hardly cared to risk the chance of their feed being sufficient after their former experiences. Once bit twice shy, is a very old proverb, and to no class is it more pertinent than to farmers. Several seasons back, farmers declined to sell lambs at a fair remunerative profit, thinking it more advisable to turn them into mutton. Their feed promised well, "but there's many a slip 'twixt th' cup and the lip," and a dry summer ruined their prospects. Turnips were a failure, and the young hoggets had to be sent to an overstocked market, glutted already with half-grown sheep, and sold at a loss, for an old song, or as the dealers declare "given away!" because the scarcity of food was universal throughout the country. Farmers are quick to learn, and so they ceased to breed their own lambs, and bought in the markets the necessary stock for consuming their fodder, if they had any fodder to consume. But the result of this

has gradually resolved itself into confusion worse confounded. Now that the farmers do not breed lambs, there are no sheep in the markets. Formerly he had plenty of sheep but no food to feed them, now he has plenty of food but no sheep to eat it. Our agricultural friends have ere now discovered that it is in the long run the best policy to breed their own sheep, and run the risk of having to sell in consequence of lack of fodder, rather than trust to buy in the market if the season turns out favourable to the growth of the feed; the reason being obvious—in the one case the farmers are all sellers—there are no buyers; in the other all are buyers—there are no sellers. In fact, our friends were too quick to learn, and hastily adopted a course of action which if they had calmly considered the matter they would have discovered was individually right, but collectively wrong, and no real safeguard against a misfortune which they could not have avoided; a misfortune, too, which by no means is certain to be repeated yearly, but one which no foresight on their part can guard against if it should occur again. Since the farmers have not bred the usual number of sheep during the past few years, the lambs which have been born during the past season are not in the aggregate as numerous as usual, although the season has been a productive one, and so those few farmers who possess lambs are not, very naturally, at all desirous of selling them.

They are required to increase their stock which has been allowed, in consequence of the panic, to fall considerably below average. Therefore lamb is dear, very dear, and we think we are not wrong in predicting, from the cautious destruction of these innocent creatures, that in 1877 lamb will be considerably cheaper. Affairs in the agricultural world will most likely by then resume their normal condition; now the market is topsy-turvy; and the live stock in the country will be more numerous, unless of course unforeseen events may occur, and we may suffer during the present summer from a severe drought as has caused us to pay so dearly for butchers' meat during the past few years. At present the weather has been unusually favourable for green crops. We do not complain of parching heat; in fact, as the Rev. Canon Sydney Smith used to say, "Summer has set in with its usual season." Our friends in the country will, perhaps, pardon us for suggesting that they have not done so; that mutton will be dearer still; and perhaps, may also have much to do with the unwillingness to come to terms with the butcher for the sale of their lambs; but we hope, we venture to predict, will turn out to be a delusive fallacy. Mutton can be dearer; its high price is due to the circumstances stated above in the case of lamb when sheep in the country is equal to the consumption of the fodder grown, mutton as well as lamb must become cheaper.

The Garden.

THE PANSY.

SHAKSPEARE speaks, in "Midsummer Night's Dream," of—

— "A little western flower,
 e milk-white; now purple with love's wound,
 maidens call it 'Love-in-idleness.' "

in "Hamlet," Ophelia says—

"There is Pansies, that is for thoughts."

homely English names have been given me flower, such as "Jump-up-and-kiss," "Call-me-to-you," &c.; but the generally accepted and acknowledged name is *sease*. Whence its derivation I have no wherewith to explain. Certainly the is a very poetical and expressive one, uch a name as might not unfittingly st itself to the occasional suffering way-o'er life's rugged paths, when contemplating the expressive and transplendent y of some of the most striking varieties. Pansy belongs to the natural order Violet- or Violets, of which there are at least seven score distinct species, scattered almost all known countries, within the ace of the cooler temperate zone. tricolor, or the three-coloured Violet, ich species there are about a dozen ct or specific varieties, is the actual t of the florist's or garden varieties of called Pansies.

re I would make one remark regarding eat bard's remark above, wherein he says, re milk-white." It would be difficult at stance of time to refute what appears to ery great error—an error which seems ore obvious when we know how difficult ld have been to have produced such r of illimitable colours and markings a simple white parent. Rather am lined to think Shakspeare, though l botanist probably, was, nevertheless,

little advised in the equally intricate knowledge of the florist. I admit that there are Violas variously white-bloomed, though to none of them should I look for a likely parent for the Heartsease.

Another variety of Viola, the Horned Violet of the Pyrenees (*V. cornuta*), a perpetual summer bloomer, is being greatly improved at the present time in our midst. So much so, indeed, that some more recent varieties, such as *V. cornuta* "Magnificent," begin to assume the circular-shaped blooms, and will doubtless become in the end a thoroughly assimilated and greatly improved class, in so far as extended blooming capabilities are concerned. I scarcely need remark that the florist's ideal Pansy, or *Pensée*, as they describe it in France, has a purely circular outline. This is in no wise a surety that the blooming capabilities are good or the habit. Hence it is a fact, that a far greater display is made by the use of select free blooming seedlings, somewhat deficient in this respect perhaps.

And it is such seedlings I would recommend as being especially applicable to villa gardens. Knowing the Heartsease is a general favourite and old acquaintance with every one who has "a heart" in a flower garden, as it begins to open its modest, but lovely flowers as soon as the snow clears off in spring, and continues to enliven the borders more or less until snow comes again. The months of May and June exhibit them in the greatest perfection, however.

The Pansy should be treated as a biennial, though it adapts itself well to the propagator's wishes, as it will root freely, either made into the form of cuttings, or by dibbling into rich soil many small divisions formed of one single root. When cuttings are chosen as

the means of propagation, they should be such as push forth around the base of the older blooming stalks, such, in fact, as may not have previously bloomed, or if at all, but little. These strike very freely, dibbled out into hand or bell glasses on to a cool somewhat shady border. The period chosen for this operation might be any time between the months of May and August, when, in fact, good thrifty young shoots, such as I have described, are produced. The nearer these cuttings are in size to the possession of 3 or 4 joints, the better. Do not permit too much of the cutting to appear above ground, but dibble them in, so that little only of the points appear. Cut the base off each, cutting close to a joint. When the cuttings begin growing, pinch back their points, to induce small bushy plants. In the case of rare sorts, where no cuttings form freely, a main shoot or two may be layered. Be very careful, in regard to dividing any rare variety, not to do so, if it can be avoided, at the advent of a dry season. Many good stocks have been lost by so doing, either thoughtlessly or unwittingly.

Where the very interesting method of raising new plants by means of seeds is resorted to, it is an excellent plan to sow the seeds on a moist, moderately-shady border, immediately they are ripened; where this cannot be done, and the grower has to depend on the purchased packet of seed, I would always recommend the seeds to be sown in pans, and placed subsequently in gentle heat; and for this reason, when the seeds are a

few days old, they will not germinate

and will not grow on an out-

door border, but in the season

they will be left

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

and will not flourish there

would succeed all the better potted off and placed in a cold frame. In lieu of this, the next best place for them is a southern sunny aspect at the foot of a wall, planted on moderately elevated borders, yet with ample soil around them, so they do not become unduly exposed at or near the base. Slugs and worms often cause infinite mischief to such young seedling plants; hence, incessant watchfulness should be directed against their depredations. If the worms loosen then from the soil, they require to be quickly pressed in place again.

I may advantageously make a few remarks regarding the most suitable situation wherein to plant them. No place is better suited to them than one whereon the sun does not shine after 10 A.M. daily. Here, the plants will attain to a vigour, and the blooms possess a consistency equal to any. The markings will be brought out to their best, and that without the danger of being scorched up by a mid-day sun, or the plants themselves being hurried into premature bloomlessness ere the early summer months are past. Like all other plants, the Pansy delights in moderate surface mulchings. These it will only be necessary to give, however, after the plants have made a goodly growth in the fresh soil. They may have been planted in or during very hot arid periods, and the only proper mulching then is finely sifted leaf mould, placed 1 inch or so in depth around their base. The soil they thrive well in is one part thoroughly decayed manure to about four parts open fibrous loam.

It should be unnecessary for me to add—all decaying blooms and seed vessels should be picked off immediately they cease to be pleasing. Long rambling shoots should be removed or relayed, otherwise the blooms will assume the inferior colours and mark-

ings.

It should be unnecessary for me to give a

list of names, as all who grow collections

of named varieties may readily obtain such

of named vendors of Pansy plants. The more

of perpetual blooming kinds, taking the com-

moner grown kinds, and readiest procurable,

are—Mrs Felton, Cleveland Blue, Yellow,

and

and

and

and

and

urple, and Magpie varieties; Cloth seeds. The Cleveland Yellow and Cloth of Great Eastern, and a very quaint Gold make very interesting summer beds able kind, called Belgian Seedling, when formed of April-struck cuttings only.— obtained from a packet of Belgian *E.*

WALLFLOWERS.

[acres of Wallflowers and Violets emit perfume that should satisfy the most is sense of smell, while there is some- most romantic in the association of ented spring flowers, speaking to us as , though somewhat metaphorically, of d sweet words, or of protecting man- und lowly beauty. But we horti- ts are not prone to indulge in sen- even when surrounded by the most il of flowers. Our constant acquaint- p has rubbed out of us too much of tue ; and when we gaze, for the first rchance, upon some lovely floral gem, uld find it difficult to get up in reality y of sentiment corresponding to that rypically ascribed to Linnæus. Just i myself, when I walk though my our's 10 acres of sweetly scented

In spite of the perfume, "shop" will ppermost ; and questions relating to ion and selection and colour, and, of sale, must all be answered before spare time to fall into ecstasies, and en I won't assure my readers that the nt was forthcoming. I prefer to deal e practical, and therefore my first n related to the time of seed-sowing, : large numbers of these wallflower- vere in bloom at the end of February. I find that an open dry time early in just when the early Broccolis and Sprouts are sown, is the time to sow vers, if you want them to flower early succeeding year. Then there are atters of moment to be attended to want early flowers ; chief amongst s the selection of some of the very blooming plants of one year to pro-

duce seed for the next year's sowing. Then the selected plants should have a good flowering habit, which is not to the market gardener necessarily a dense bushy habit, but rather a habit that sends up all the flower-stems evenly and at once, so that the whole may be clean cut, and the plant pulled to make room speedily for a succeeding crop. Then a good, stout, well-expanded pip is needed, and, finally, the deepest and richest possible colour. To all these requirements my neighbour has a keen eye, and as we walk through the flowery field, a stick is placed here and there by the side of some specially good plants, and these remain to produce in a future year one of the finest strains that are grown around London.

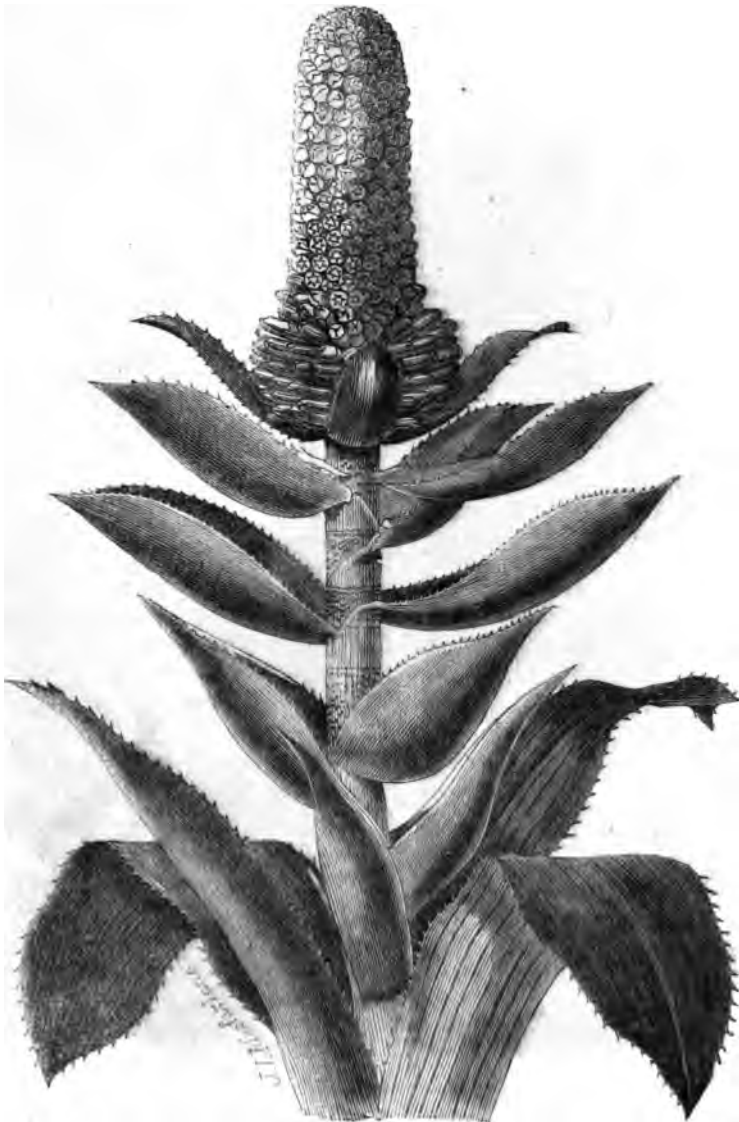
To come back to cultivation: as soon as the seedling plants are 6 inches in height they should be planted out with a dibbler, either into a well-manured piece of ground expressly prepared for them, or in between the rows of Violets, as is the case with my neighbour's plantation. Beyond an occasional look over to make good losses, and a frequent application of the hoe, no other attention is required until the cutting time arrives in the succeeding spring.

Colour is a matter of grave importance to the grower, as the Cockney tastes are entirely in favour of the darkest flowers that can be produced, and to procure a strain that has this requirement so much care has been exercised that the world yields no better dark varieties than are grown for the London market. Young's famous blotched kinds are not superior in colour, and are decidedly inferior in habit of growth and in texture of petal ; Saunders's resemble in habit, but are

wards the ends, from 12 to 18 inches long, and dark green. The flower spike is erect, and rises from the centre, the lower portion clothed with large oblong boat-shaped bracts of a rich magenta, shaded with rose, and which remain for two months in full perfection ;

XANTHORRHEA AUSTRALIS.

If any one wanted a plant of an ornamental character for conservatory decoration that would take rank in point of stature, in point of effectiveness, and in general contrast with the stately tree Ferns of Australia, we



Æchmea Marie Regineæ.

the upper portion is thickly studded with flowers, which are tipped with dark blue changing with age to rose."

would unhesitatingly point to the Australian Tree Grass as one of such that may have rivals of equal value, but could not be

excelled. We have secured from Mr Williams, of the Victoria Nurseries, Holloway, the cuts of this and the following new plant—all of which are of first importance

popularly known as Black Boys, Grass C Trees, and Grass Trees. Several species of Gums produce stout stems varying from 18 feet in height, supporting on their sum



Black Boy, (Xanthorrhoea australis)

...ulous grass leaves ; the stems are mostly simple and unbranch though some fair examples are met w supporting two and three distinct hea whilst other species never develop an abor

cent stem. A gum resembling dragon's blood is obtained from some of these plants, and imported under the name of Black Boy Gum. We find, as a rule, all such plants do best in limited pot room. Some object to sink them below the ground-line, as having a tendency to kill the plants, possibly, with too much moisture. This cannot be the case if

IXORA WILLIAMSII.

Every plant admirer is familiar with the glorious globular trusses of the family of *Ixora*. Those who have seen the specimens that have been recently exhibited at the London and Manchester and York and Leeds flower shows, will not easily forge the effect of the plants grouped among their



Ixora Williamsii.

ordinary care is maintained. We saw several plants at Kew—Ferns and Grasses as well, that seemed to root up the stem when they were plunged underground. Doubtless this is one of the species that might be so treated, and if growers are careful as to watering, there need be no fear of bad results. It is a most graceful Tree Grass, and we would like to see more of it introduced, and more of it cultivated in our collections.

fellows of dissimilar habit and dissimilar inflorescence. We have long admired the magnificent plants that have been shewn from time to time, from the days of Mr Dodds, who shewed from Sir John Cathcart's collection, now dispersed, to the days of Mr Baines, the spirited and intelligent horticulturist and cultivator. Mr Baines shews so grandly from Mr Nicholl's collection, that we look with particular favour upon any novelty of

the same family that is like to add to the interest, and extend the variety of so beautiful a conservatory stove plant.

And we have in the illustration before us, which we transfer for the eye of our reader, a plant which is likely to be as popular in its way, as either the beautiful *I. amboynensis* or *I. javanica* were in their way. The *Ixora Williamsii* is a garden hybrid partaking of the growth of *I. Amboynensis*, but assuming as it gets older somewhat the style of *I. Griffithii*. It differs from both these sorts, in having flowers of what has not been inaptly described as of the hue of reddish

salmon, and forming a head of grand s vying with the most popular in that respect as well as taking rank as a first sort for free flowering properties. No one who craves for variety will long be without *I. Williamsii*—a capital fellow for the pure white ; lovely *I. Colei*. To flower any of the fan properly, the plants should be allowed to grow rampantly, tying the branches down into position as soon as the flower umbels are formed. Great attention is needed to keep under the white Coccus, which multiplies rapidly where cleanliness is not fully maintained.

MOUNTABLE FLOWER POTS.

AMATEURS are often troubled, when repotting favourite plants, to find that nothing but a large amount of force can cause the old pot to give up its contents. Under ordinary circumstances, when the plant is not in flower, a little rough handling will do no

Radclyffe & Co.'s enable the villa gardener to overcome all difficulties ; for by simply turning a key, they may be taken to pieces and adjusted. Plants can be easily transplanted without even disturbing the soil, as for earth can be effectually supplied without



Fig. 1.—Mountable Flower Pot—Pot open.



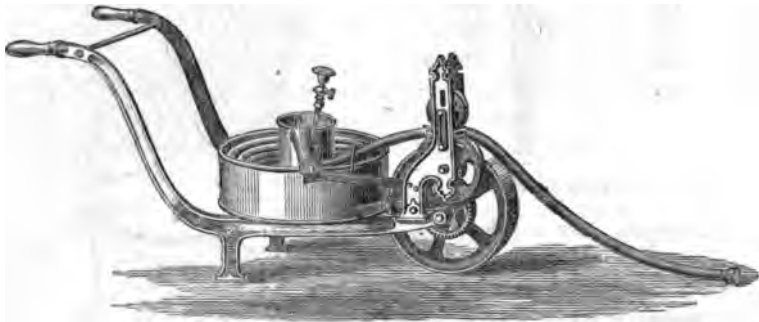
Fig. 2.—Mountable Flower Pot—Pot closed.

harm, but the case is altered when it is loaded with bloom. These pots of Messrs Dick juring the roots. Fig. 1 shews the pot opened, and fig. 2 closed.

THE "SYREILEON."

That the manufacturers of useful articles are sorely puzzled in finding names for their inventions, the title to this sufficiently proves. It is almost as remarkable as the word "Ozokerit," which for so many weeks heralded the "bringing out" of Mr Field's candles. Fortunately for the ignorant, Mr Haynes, the patentee of this really useful

comes the great difficulty of coiling up long lengths of hose after use. According to the patentee, hose used with this machine will last longer than that coiled by hand, which is liable to get twisted and cracked; and being gathered up at the same rate at which the barrow moves, is not drawn across flower beds, nor injured by being dragged along



The "Syreileon," or Garden Hose Barrow.

adjunct to every villa garden, in some degree explains what a Syreileon is, by giving a sub-name—"Garden Hose Barrow." Well, this Syreileon is really an admirable contrivance for economizing the labour of those who water their garden with a hose, for it entirely dispenses with the trouble of dragging it about, and it, as effectually, over-

gravel paths. Further, the whole or any part of the hose may be unwound and used without the necessity of screwing or unscrewing union joints, which are often the cause of leakage. The pan containing the hose may be filled with water, which is known to be the best means of preserving hose from injury.

TABLE AND STAND FOR FLOWERS.

The material of which the table (fig. 1) is made, may be either of ebony, mahogany, rosewood, walnut, satinwood, or oak, according to fancy; but if cheapness is to be considered, it may be made of plain deal, stained (not painted), and varnished or French polished. The interior should be lined with thin lead, zinc, or copper, and provided with a waste pipe attached to the lower part of its bottom, and regulated by a brass tap, so placed as not to be seen from any part of

the room. This is intended for withdrawing the water that may accumulate, and so prevent its overflowing. The plants are to be packed in moss kept perfectly green and fresh on the surface. The basket-work round the top should be brass, inclining rather outwards at top, and only from 4 to 6 inches in depth, as the framework of the table is presumed to be deep enough to hide the pots. The whole of the brass-work should appear above the surface of the moss.

This table may be used for cut flowers, half of the box being filled with moss, and the rest with fine white sand, into which the flowers are to be stuck nearly up to their calyx. If tastefully arranged with regard to the harmony of colours, such a table will have a pretty effect, and the flowers will last for several days if not exposed too much to

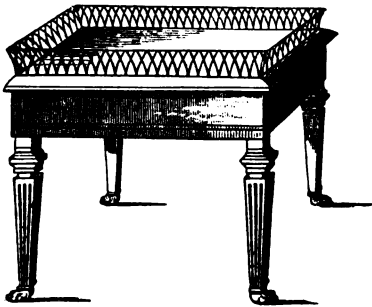


Fig. 1.—Table for Flowers.

the action of the air. As a rule, all stands with cut flowers should be provided with glass shades to be put on at night, and removed just before breakfast in the morning, to secure them from dust which must necessarily arise in doing up the rooms in the morning, and also to protect them from air. The moss and sand being saturated with water when they are put in, the flowers will remain much longer in a fresh state than if placed in water alone.

Fig. 2 represents a flower-stand made of the cheapest material, wire, on a cast-iron tripod. If bronzed or gilt, such a stand

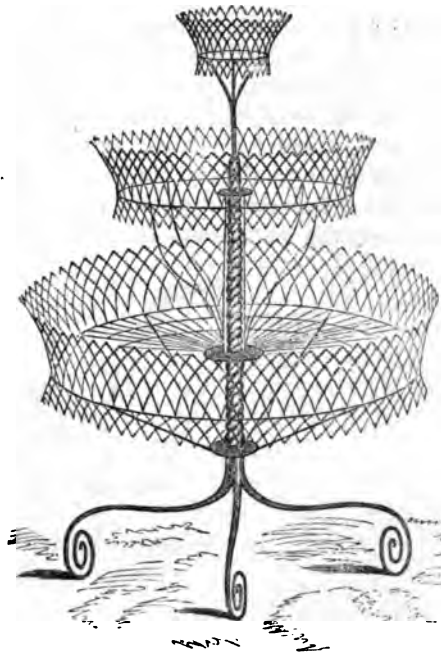


Fig. 2.—Flower Stand of Wire-work.

would not be out of place in a drawing-room but when simply painted or galvanized, which is better, its fitting place is out of doors.

DRESCHLER'S FUMIGATOR.

This patented Fumigator, which is manufactured by Messrs. Dick, Rodolphe & Co., of Lyons, France, is a most valuable and useful article. It is a small, portable, and easily managed apparatus, which is used for fumigating rooms, and for destroying insects, and for other purposes. It is a most valuable and useful article, and is highly recommended by the French Government, and by the French Academy of Sciences. It is a most valuable and useful article, and is highly recommended by the French Government, and by the French Academy of Sciences. It is a most valuable and useful article, and is highly recommended by the French Government, and by the French Academy of Sciences.

here figured, which also differs entirely from all other fumigators in its principle, and is



Dreschler's Fumigator.

in the entire absence of everything approaching a toy character."

Arboriculture.

ORNAMENTAL TREES FOR CITY AND SUBURBAN PLANTING.

ORNAMENTAL trees for city and suburban planting have been engaging the careful attention of arboriculturists and gardeners more and more during these

And very properly so, it may be said, for we do not know a subject in connection with villa and street adornment of so momentous an issue for ministering to the comfort of the dweller in particular, and the promenader at large. Villas may be made so comfortable for purely domestic purposes, but if they be wanting in exterior ornament, they appear bald and cold and comfortless, not only to those specially interested, but even to the passers-by. What a delightful thing it is to have a leafy screen at the back of the parapet that bounds the villa or tenement from the road, with its ornamental iron railings. It intercepts, partially, the gaze of scrutinizing eyes, and supposing it did not, it gives life and colour to the dead architectural pile. Living in the breeze of the green foliage, the summer's zephyr, gives buoyancy to the feelings, and has a tendency to make one feel the happier and the better for it. Every tree has an individuality of its own, its habit, its formation of leaf, and its mode of colouring—all command for it, or to command for it, a more than mere glance.

For the dweller in the suburbs, who inhabits a tenement, cannot have trees in their way of growth, let the climate be ever so

The space confronting him is too small for that; he must be contented with a growth of pollard vegetation. The hand of the owner must interfere to keep tree life within its bounds. Trees are all very well in their proper position; but when we are to use of them as front or boundary

screens in a limited area, we must keep them within proper limits. It is not wisdom to allow them to overshadow or interfere in too great degree with the windows of the house. A respectful distance must be maintained. Besides intercepting the play of light when they assume too great dimensions, they interfere with the circulation of air; and although their leaves are constantly in search of those nitrogenous gases inimical to the life of man, which may be let out at the top of the sitting room windows, they steal, or rather bar out, that oxygen which has the proper animating and correcting influence on the health of the inmates, a little of which should be judiciously admitted at the bottom sash.

TREES FOR TENEMENTS OR VILLA BOUNDARIES.

Assuming, then, that we were asked the question, What is the best tree for belting or boundary purposes for any tenements or villas in or about large cities, we should have some hesitation in giving an off-hand reply. Were we to say the Lime (*Tilia europæa*), we would have many sympathetic supporters, but we should have also a host of non-contents. The first party would say, "I think you are right. We have seen all the trees employed for tenement adornment about cities and towns, and we have no hesitation in saying that the Lime moulds itself to the will of those who are continually, or year by year, amputating its limbs; and, moreover, it is a most beautiful-leaved tree, gives off its scent 'before the evening gale,' and stands pre-eminently at the head of its fellows." This is no doubt true, so far as it goes, but let us hear what the second party says:—"I prefer for my planting the Occidental Plane (*Platanus occidentalis*). It may not come

into leaf so soon as the Lime, but when it does so its leaves are large and worth looking at, and it forms a fine umbrageous shade dying off, too, in the autumn in various tints of gold. It is more enduring than any of its compeers, in my opinion." Both these parties have, no doubt, stated the truth, but let us see, or rather analyze, the *pros* and *cons* of both.

THE LIME TREE.

The Lime tree comes early into leaf, and that is one point of importance after the long rest of winter. Its leaves individually are not so large as that of the Plane, but collectively they form a grand group, and the tints are such as to be more than captivating. Moreover, the leaves are denser set together than those of the species to which it is compared; and the fragrance which a line of them gives off is another point entitling their claims to be heard. Again, they can be pruned like a Willow, and like a Willow grow on again, as if nothing had happened to injure their system. They have a good appearance from early May until late August. In very dry seasons the leaves become sickly-like, even in July, but that is more the exception than the rule. In our moist northern cities and towns this is a tree long known and highly favoured, and whatever prejudice we may have against it as an avenue tree, or an ornamental tree for individualizing, say upon a lawn, we have not the slightest hesitation in recommending it as one of the first and best for tenements, and for such villas with limited frontage where the owner or occupier is compelled to pollard them. There are three distinct claims upon our attention, and they are all well founded. The first is its early leafing, its habit of growing on again, and its fragrance. The second is its compact growth, and its ability to be pruned like a Willow. The third is its long life, and its ability to be pruned like a Willow. The first is its early leafing, its habit of growing on again, and its fragrance. The second is its compact growth, and its ability to be pruned like a Willow. The third is its long life, and its ability to be pruned like a Willow.

the Lime is still the best tree for that purpose. It has been condemned, but it has been condemned without consideration, or rather the parties that have condemned it have not been explicit enough in their declaration as to the *where* it has proved unsuitable.

THE OCCIDENTAL PLANE.

Now as to the Plane, the modern ruling, we believe, is in a great measure right. Preeminently it is the best tree from an endurance point of view. It is the best tree we said, only, however, *as a tree*, not to be cut and hacked at and trimmed, as we see Limes for screen purposes. Mr Mackenzie decided quite rightly when he recommended the Metropolitan Board to plant Planes along the Thames Embankment. We would endorse that recommendation, so that it might in future be taken advantage of by all boards or committees, no matter what city or town they may live in in these islands. It is stately in its growth, its foliage amplifies to considerable dimensions, and it is not flimsy or silk-paper like, but coriaceous and of good appearance, as it moves before the will of the breeze. Moreover, it grows upwards and laterally, to assume a goodly habit; and the smoke, and the dust, and the wind only partially disturb its career physically.

THE ORIENTAL PLANE.

We cannot say so much for its twin brother of the East—the Oriental Plane (*Platanus orientalis*). It is more tender in constitution, does not take so well to city life, and consequently should not be planted as a fellow, either in juxtaposition or alternately with the Occidental Plane. No one can but admire its noble appearance, its large palmated leaves, more deeply incised than those of the Western Plane, and its long life through the autumn months. These are points of importance to be catered for by the horticultural effect, but when we consider that it is uncomfortable in most localities about cities, we are better not to interfere with it, especially to select it for such a prominent position as an avenue tree,

or as a tree which the eye rests upon, expecting all but perfect individuality.

THE BLACK ITALIAN POPLAR.

Another capital tree for screens is the Black Italian Poplar (*Populus monilifera*). If any one wanted rapidity of growth without being particular as to handsomeness of habit, then we would say plant the Black Italian Poplar. It is quite a city tree, will grow in spite of the want of light and the want of pure, clear, bracing atmosphere. As the Aucuba among shrubs or evergreens, so the Poplar among trees, it seems to live and thrive like the little urchins, in the lowest, worst ventilated parts of London, among the "dirt" that accumulates, throwing up its tall gaunt branches to the amazement of those who watch its progress. Fortunately, however, for the thriving citizens of London, the suburbs are quite as healthful and as cheery like—in some cases far more so than many country villas. Far out of the reach of towns the trees grow with a will, and make the residences more like those fairy-land scenes which poets and novelists paint, and which could scarcely be credited in their reality by those who look upon them for the first time as glimpses of suburban London.

THE KIND OF PLANTING REQUISITE.

One particular grievance, as offending the eye of taste, we have to complain of. It is not, in our opinion, in good taste to have a screen, covering we shall say a strip of 20 yards, planted with different descriptions of trees. It is, indeed, quite as intolerable a feature as having a coat or a pair of unmentionables made of different colours of cloth. Here a Lombardy Poplar, there a Lime, next a *Cytisus Laburnum*, next an Oriental Plane, next a Black Italian Poplar, and last an Occidental Plane. It looks bad even upon paper, and it appears a great deal worse in reality. We have no sympathy with those who wish this kind of variety in limited places. One species of tree for a belting or strip is all that ever should be aimed at. Even supposing the frontage were more considerable, it is in bad taste. Some turn

round upon us, and say, will you decry and denounce straight lines of *Pelargoniums*, ridiculing them as a line of miniature red coats, and why wish no variety in a tree margin? The two cases are totally different. You are confined to a narrow margin. You want a screen, and you demand something like good effect. The space is too limited, both heavenwards and earthwards, to go in for variety-effect; and consequently the best thing to do is to shew that the necessity of the case demands the formality wrought out. You cannot conceal your object on the one hand, neither have you scope to work upon to shew up the forms and features of trees as you would have to shew up the forms and features of fugacious herbaceous plant life.

HOW AVENUES SHOULD BE PLANTED.

We even go a step farther and aver that for avenue planting, in towns particularly, that one description of tree, or as near as possible one general habit of tree, should be selected. It would be perfectly incongruous to plant a Lombardy Poplar alternately with an Occidental Plane. The one is strictly of conical habit, the other of columnar habit. It would be like placing a walking-stick in the centre piece of a chain border alternately with selected plants of the palmate Maple (*Acer palmatum*). Nor should the Horse Chestnut (*Æsculus Hippocastanum*) rank alongside of the Spanish Chestnut (*Castanea vesca*). They are distinct types of trees, looking beautiful as individuals, or, in some cases, as avenue plants, but not fit associates for avenue planting. Let a selection be made of the particular kind of tree best suited to the locality, and stand by it. Let not the hand of time affect, as it is bound to affect, the uniform growth of the plants. If they be of many kinds and colours like Joseph's coat, the seasons will not affect them simultaneously, neither will the soil. Cold and heat, rain and drought do not affect species in the same way. It is desirable to have avenues of trees as uniform in style as practicable; and if it be so, generally speaking, it is so more emphatically in the decoration of any avenues there may be in town and suburbs.

The Veterinarian.

SCOUR IN SHEEP.

By C. W. SUTTON.*

THE affections we are considering have their habitation mostly in the intestinal canal, and their rise in the material which may be taken into it, which, if of an irritating nature, will set up a faulty action when it comes in contact with the highly sensitive lining membrane of this canal, and this may also be produced by causes not acting directly upon the intestinal canal, as we shall see presently. It is very important to be able to distinguish and separate one cause of diarrhoea from another, and to discover whether that cause is acting directly or indirectly on the intestinal canal. And I find nineteen out of twenty believe that it always arises from something that disagrees with the digestive organs, and treat them accordingly, changing their food, giving corn or cake, but all has been done without good resulting; and what is the reason of this? Simply because the symptoms were not understood, and thus they have gone on treating their flock in perfect blindness. I wish, therefore, to call your attention to the fact that although diarrhoea or scour may (to the casual observer) be the prominent symptom, yet it is the result of several causes, such as the effect of simple irritants, improper food inferior in quality, rank or wet and sloppy grass, the action of *Filaria bronchialis*, commonly known as worms in the throat, worms in the intestines, &c.

It is generally known that great losses amongst sheep when first put upon swedes, and especially if the roots are in a rapidly growing condition,—and why? They are not, the starch has not been converted

into sugar, the nitrogenous matter they contained was not in a healthy form, and so irritated the bowels and produced scour; and the plan I have known some good practical men adopt, of lifting the roots, causes part of the water to evaporate, and render them less liable to disagree. It should be our endeavour, whilst attempting to make the most of our flocks, to keep them as closely as we are able to a natural state. Unfortunately, the higher land is farmed, proportionately so do we diverge from the natural to the artificial state, and the more difficult it becomes to rear lambs; for keep they may be thoroughly adapted to fattening sheep, which may be refolded several times upon the same land during the year, would be highly injurious to a breeding flock, and, in all probability, cause great loss amongst it by the too succulent character of the root crops, or the too luxuriant growth of grass upsetting the delicate digestive process of the lambs, directly by the food they consume, or the ewes' milk being too rich in quality, either of which may produce scour.

In diarrhoea produced by these causes, I would adopt the following treatment:—First, a change of keep, substituting cut hay, straw, straw peas, corn, or bran for some of the diet they had been consuming. Nature is adopting her own method of cure; therefore, do not be in too great a hurry to administer anything to arrest the discharge; but if the diarrhoea is prolonged after the change in keep has been carried out, give something to assist nature in carrying off the offending matter, for which purpose give to each sheep, linseed oil, 2 or 3 oz.; opium powdered, 5 grains, or a teaspoonful of laudanum.

* Read before the Stowmarket Farmers' Club.

anum in gruel on two following mornings, after which, should the diarrhoea continue, it may be found necessary to give a stringent antacid medicine, for the mucous membrane having become relaxed and weakened by the previous irritation, a faulty action may be set up, which continues, although the irritation which caused it may have been removed. Therefore, in such cases, the following will be found valuable:—Take prepared chalk, 1 oz.; powdered catechu, $\frac{1}{2}$ oz.; powdered ginger, $\frac{1}{4}$ oz.; powdered opium, 1 drachm; bicarbonate of potass, 4 drachms; pepper-mint water to 8 oz. Of this let two table-spoonsfuls be given twice-a-day, a proportionate dose to very young sheep.

DIARRHOEA ACCELERATED BY PARASITES.

We now come to a disease very fatal to young sheep, and one which, I fear, is greatly on the increase, and from which there have been immense losses to flock-owners; and it seems to me somewhat strange that they have gone on losing their flocks, not by an odd one or two, but in some cases by scores, with a listlessness of effort that to me appears unaccountable. The first we hear of is this:—"I am losing a large number of lambs from scour, and I think there is something in my keep that has been prejudicial, or does not suit their digestion;" and when asked what has been done for them, the reply is generally, "I have changed the food: they were on clover, and I changed them to old grass;" or, "They were on bare pasture where the ewes had been, and now I put them on clover; but that makes no difference." Here, again, diarrhoea was looked upon as the cause of the mortality; whereas, upon inquiry, it was found that they have coughed very much, almost incessantly, producing evident distress. The animal does not obtain any relief from the act of coughing, and a great obstruction is put upon the proper aëration of the blood. Emaciation of the frame ensues, rapidly ending in death. The appetite is capricious, or almost wanting, the diarrhoea becomes aggravated, the thirst is intolerable, and the poor sufferer madly laps at anything of the character of a liquid,

straining with the back arched and feet drawn together, and in this attitude voids small quantities of very stinking matter, sometimes tinged with blood. This trying, and if neglected, fatal disease is caused by the presence of a parasite in the throat, and called the *Filaria bronchialis*. It appears that if one or two of the worms get into the bronchial tubes, they are quite sufficient to lay the foundation of extensive disease. Passing as far as they can through the bronchial tubes, they enter the air cells of the lungs, and deposit their ova or eggs by myriads; and by means of these foreign bodies an irritation is set up, first in the lining membrane of the air cells, and then in the lung itself. It is estimated that one of these worms will produce millions upon millions of eggs, and thus we can form some idea of the amount of mischief that ensues.

Any delay in the treatment of this disease makes the cure more difficult; therefore, it will be wise to have a rigid examination of the first dead carcase to determine the cause of death. Now, the diarrhoea here is not a disease primarily affecting the alimentary canal, therefore it can be of no use to give astringent medicine, nor will a change of food produce any good result. But our endeavour must be to get rid of the worm as it exists in the bronchial tube or windpipe, and to root out the disease which has been produced in the lungs. The inhalation of sulphurous acid gas, or chlorine gas, will be found a ready means where the flock is large; the sulphurous fumigation will be the safer in inexperienced hands. To do this, place the sheep in an out-house, where they can be made to inhale the fumes of sulphur thrown from time to time upon burning tar, so as thoroughly to impregnate the air. By this means the parasite may either be destroyed, or caused to quit the parts. The chlorine gas fumigation, though an efficient agent, is, in the hands of a careless person, very likely to kill the sheep, but, if conducted as follows, can produce no ill effect:—Having driven the sheep into a convenient place, get some chlorinated lime (usually called chloride of lime), and make it into a creamy

consistence with water in a dish; upon this pour gently sulphuric acid, and chlorine gas will be disengaged, which, when sufficient has been disengaged to make it unpleasant to the operator, he should retire, taking the apparatus with him, and leave the animals to inhale the medicated air. After this give some such mixture as the following: Take powdered nitre, $\frac{1}{2}$ lb.; common salt, 3 lb.; powdered ginger, $\frac{1}{2}$ lb.; boiling water, 3 galls.; when nearly cold, add spirit of turpentine, 24 oz., and shake all well together. The dose of this for lambs four to six months old is 2 oz., or four tablespoonfuls. These doses may be repeated every second or third day for a few times; and in localities where this disease prevails, a few doses should be given in July and August. This will often prevent the scouring and mortality so common amongst lambs when first upon turnips. Cake, peas, beans, or corn should be given unsparingly in every case of this kind, and it should be given before the diarrhoea has rendered the digestive organs too weak to assimilate the food, for we know by our own experience, that when we suffer from indigestion, no food, however good, agrees with us or does us good.

WHITE SCOUR IN LAMBS.

The next variety of scour is that which occurs in young lambs, and is first noticed when a lamb that has been healthy, and the

ewe yielding a sufficient quantity of milk, is evidently distressed, and the evacuations all of a pale colour, exceedingly acrid, causing great irritation and excoriation of the parts they pass through. This disease is called white scour, and mostly attacks lambs when the ewes are highly fed on turnips, and at the same time with oats, peas, oil-cake, &c., or when turned into strong, rank grass. The real cause of this affection I believe to be an unhealthy condition of the milk secreted, owing to the too-luxuriant feeding on highly-nitrogenized food. The young stomach is not equal to the digestive power it is called upon to exercise; the milk becomes coagulated, and the stomach has been found quite filled with curd, even to the weight of 3 or 4 lb. For treatment, first let the management be altered, and in no case does chemistry come to our aid with more decided power. A free acid (lactic) in excess has caused the mischief; and to neutralize that acid by an alkali will always be the most successful plan of treatment. Take bicarbonate of potass, 1 scruple; carbonate magnesia, $\frac{1}{2}$ drachm; given in water for a dose, and repeated freely if required; and after a few doses have been given, add powdered rhubarb, $\frac{1}{2}$ scruple, powdered ginger, 5 grains, mixed with it, and given in peppermint water. With such management the disease will be quickly arrested.

DIAGNOSIS—DISCRIMINATION OF DISEASE.

THE following article, taken from the *Country Gentleman*, is a continuation of the series which appeared in the last issue. It is a very interesting and valuable contribution to the knowledge of the diseases of animals, and is one of the most valuable contributions of veterinary science—partly owing to the many different forms of the same disease, to be found with the various animals, and partly to the impossibility of obtaining information in regard to the cause or

development. Our most able physicians, with all the means of obtaining information which they possess, are sometimes greatly embarrassed by the difficulties attending this branch of their labours; is it to be wondered, then, that the veterinarian should find it is the most troublesome of questions, hence he is obliged to study it in half a-dozen different forms according to the peculiarities presented by as many different species of animals? But the physician, who confines

actice to the genus *homo*, has another a very important advantage—he is ed to the exact location of the malady e sensations of his patient, which may mmunicated to him with the utmost less. The veterinarian, on the other is obliged to obtain all his information the imperfect workings of some part or of the animal machine ; he cannot even re what the owner or keeper chooses to im, for he is so often wilfully deceived ese individuals, who desire to test his rdness or knowledge.

is then of the greatest importance to the position, the function, and the urance of each organ in health, as well ir combined action when the organism nsidered as a whole ; more than this, it cessary to be familiar with the modifica- which disease brings to each organ, and gh it, by sympathy, to the other parts of ody. It is here that quacks and charla- of every description find their greatest ling-block ; knowing nothing of anatomy ysiology, they can never understand the nature, the symptoms, or the cure ease. And this is one of the most im- nt points for stock-owners to consider, they often employ men to doctor animals with the single recommendation hey have passed their lives in a stable. ist be remembered that it has taken eds of years of the patient labour of men to gather, with the best facilities, the nation that we possess on the subject of nary science ; and with all this at his al, the educated, honest practitioner onfess that he finds problems which are lt to solve. If, then, any man has the nce to ask for veterinary practice, simply se he has spent a few years in a stable een a few sick animals, he may be dis- l at once—he can do nothing but mis-

A man, claiming to be a great physi- ecause he had always lived with men, ad taken care of them in health and e, would at once be seen to place him- a very absurd position, and would be d upon with deserved contempt ; but unately people have not yet come to

look upon veterinary charlatans in this light, and the unreasonableness of their claims is not realized.

In attempting to diagnose a disease, it is customary to first take a rapid glance at the general appearance of the animal, and then examine the different apparatus separately. With the first glance, one will perceive the expression of the face, the position of the head and legs, the excitability or stupor, the fatness or emaciation, and the peculiarities of the gait. Then the skin will be noticed in regard to its colour, its tension, the state of its secretions, its temperature, the wounds or cicatrices that may be found, the swellings or distension of any parts of it, the character of the hair or wool, and with the horse, the exploration of the space between the branches of the lower jaw. The attention will now be turned to the respiratory apparatus, and the colour, temperature, secretion, swellings, &c., of the nasal mucous membrane noted ; next the larynx and trachea will be examined, and the apparatus considered as finished after percussing and auscultating the lungs, regarding the characters of the respiratory movements, the cough and nasal discharge (if any.)

The circulatory apparatus may be taken as next in order, and a knowledge of its state obtained by auscultating and percussing the heart, and by noting the frequency and other characters of the pulse. Then the digestive apparatus, in which we include the condition of the mouth, teeth, tongue, and pharynx, the manner in which the food and drink are taken, the appetite, thirst and digestion as well as the size, movements, tension, sensibility, &c., of the abdomen, and the frequency, quantity and quality of the excretions. After this the urinary and sexual apparatus may be examined, noting particularly the sensibility of the loins, the colour, quantity and quality of the urine, the presence of albumen, &c. And lastly, the nervous system and organs of sense appear for consideration ; here the attitude, excitability, muscular contractions, paralysis and pain are the most apparent symptoms ; the mucous membrane and other parts of the eye should not be forgotten.

Of course this order of succession is not

laid down as the infallible and only proper mode of examination, since many of the most able veterinarians commence by noting the condition of the various organs of the head, then pass to the chest and abdomen, and finish with the organs of locomotion. This last proceeding, however, is to be considered as requiring much more skill and experience

than the other, as it should be borne in mind that it is important to know the condition of every apparatus in the body, as well as that particular one in which the disease is located. For this reason it is always considered preferable to have a plan of examination, to be followed regularly, so that nothing may be forgotten.

SUPPOSED CASE OF POISONING A COW BY POPULUS BALSAMII.

By Professor WHALLEY, Veterinary College, Edinburgh.

ON the morning of April 9, a cow and a heifer were turned into a small field for the first time. About 5 P.M. they were brought into the yard with the intention of housing them for the night. While waiting for the man they strayed into a patch of grass land close to the stables; the cow was observed gambolling and playing with the heifer, when almost instantaneously she bellowed, ran backwards, and fell prostrate, after which she never wholly regained her legs.

When I first saw her, at 9 P.M., she was tympanitic, and presented all the symptoms of poisoning by a narcotico-irritant poison. The progress of the case and the post-mortem appearances confirmed my first suspicions.

I examined very carefully the herbage and the various trees in and around the field, but could detect nothing poisonous in the herbage; neither had some yew trees, which were growing in various parts of the field, been interfered with. I, however, observed that several branches had been lopped off a *Populus Balsamii*, which was growing in the field. The heat of the sun had rendered the leaves of this tree very penetrating. I had previously extracted my finger with the juice of the leaves, and it had not been long since I had seen a specimen of the same juice. I thought it highly probable that the juice might have been the cause of the poisoning, and an impression probably strength-

ened by the presence of a large quantity of the leaves and young shoots of the tree in the animal's stomach, as revealed at the post-mortem examination, and by the strong odour proceeding therefrom, when the organs were laid open.

Now, although, so far as I can find in any work in medicine or botany in my possession, it is not known that this species of Poplar possesses poisonous qualities. I am firmly of opinion that in this instance it was the cause of death. The strong odour and the gummy exudation in the young shoots and buds lead to the conclusion that the tree possesses more than the ordinary qualities of others of the same genus. Possibly, chemical action may have altered the natural secretion and rendered it poisonous, as it is known to do in the yew, which, as you are doubtless aware, is much more poisonous in its partially withered state. Furthermore, I find in Hooper's "Medical Dictionary," that a substance called Tacamahaca was (or perhaps is now) found in commerce, extracted from the "Fagona Octandra" and the "Populus Balsamifera," which was supposed to possess several medicinal properties, particularly nerve.

I have prepared a tincture from some of the green leaves, and intend at the first opportunity administering it to some small herbivorous animal.

The Dairy and Poultry-Yard.

THREE YEARS OF POULTRY KEEPING.

THE following are some poultry statistics recently given before the New Brunswick, N. J., Farmers' Club, by one of the members, Mr F. S. Hart:—

In 1869 we first commenced keeping an account with our poultry. We had about sixty fowls—forty hens and twenty cocks; some of the latter being small were soon sold, leaving about fifty for breeding. Every egg laid and every lb. of poultry sold or used were credited to them at market prices; every egg set, and the food consumed, were charged at ruling prices. At the end of the year they stood as follows:—

| | Dr. | Dol. | Dol. |
|--|-----|---------------|------|
| To sixty fowls, at 50 cents | | 30.00 | |
| „ feed, and eggs set | | 84.64 | |
| | | <u>114.64</u> | |
| | Cr. | | |
| By 115 fowls, at 50 cents. | | 57.50 | |
| „ eggs laid, 2784 (about 70 each), and poultry | | 126.49 | |
| | | <u>183.96</u> | |
| Balance | | 69.35 | |
| Average per fowl, 1 dol. 38 cents. | | | |

The fowls occupied a plum orchard of about $\frac{3}{4}$ acre—room enough for 100 fowls or more—and a small building for laying, roosting, &c.

In 1870 we tried again, starting on a larger scale, 115 head in all—85 hens and 30 cocks. Killed off some cocks, leaving about 100 for breeding. Kept them as last year. At the end of the year they stood as follows:—

| | Dr. | Dol. | Dol. |
|---|-----|---------------|------|
| To 115 head, at 50 cents..... | | 57.50 | |
| „ feed, and eggs set | | 126.27 | |
| | | <u>183.77</u> | |
| | Cr. | | |
| By 215 head at 50 cents | | 107.50 | |
| „ eggs laid, 7458 (about 88 each), and poultry sold | | 243.57 | |
| | | <u>351.07</u> | |
| Balance | | 167.30 | |
| Average profit per fowl, 1 dol. 67 cents. | | | |

In 1871 we tried it on a still larger scale, having three yards to confine our poultry in. Started with 215 old fowls—190 hens and 25 cocks. We ran mostly on chickens, not trying to get eggs; consequently the average number of eggs to the hen is smaller. We set in all 3200 eggs, mostly Dunghills, some pure stocks, and a few ducks and turkeys. We hatched about 2000 chicks and will probably raise about 1000 head in all; at one time 59 hens were sitting on 767 eggs, and 25 or 30 hens were hovering several hundred chickens. The season was very poor for raising poultry—so many heavy storms; in one storm we lost over 70 birds. We also find that crows are very fond of chickens, over 300 being charged to them.

Our nine months' account is as follows:—

| | Dr. | Dol. | Dol. |
|--|-----|---------------|------|
| 215 hens and cocks, at 50 cents. | | 107.50 | |
| Feed | | 201.59 | |
| 2920 set (common) | | 48.83 | |
| 250 duck eggs | | 6.00 | |
| Guelder, W. Cochin and Houdan eggs .. | | 15.00 | |
| Pepper and alum..... | | 5.00 | |
| | | <u>383.92</u> | |
| | Cr. | | |
| 9573 eggs at (about 50 each), 19½ cents .. | | 187.01 | |
| Old fowls sold | | 22.10 | |
| Young fowls sold (137) | | 80.74 | |
| 194 chicks at 8 cents. | | 15.52 | |
| 35 ducks | | 22.04 | |
| Ducks' feathers | | 1.50 | |
| STOCK ON HAND. | | | |
| 146 chickens, fattening, at 60 cents. ... | | 87.60 | |
| 100 pure Brahmas | | 150.00 | |
| Two pairs Houdans, at 10 dol. | | 20.00 | |
| Two pairs Cochins, at 10 dol. | | 20.00 | |
| 400 chickens (Dunghills) | | 200.00 | |
| 150 old fowls, at 50 cents. | | 75.00 | |
| 35 ducks, at 50 cents..... | | 17.50 | |
| 15 turkeys | | 10.00 | |
| | | <u>909.01</u> | |
| Balance..... | | 525.09 | |
| Average per fowl, 2.50 cents. | | | |

We set our hens in boxes that have covers, so one hen cannot bother another. They are placed along the house in rows of fifteen or thereabout—some on the floor, others about 3 feet from the floor. When a hen wants to set, we put thirteen eggs in one of these boxes, sprinkle a handful of wood ashes over them—sometimes we put in a stalk or two of tansy—put her in, shut down the cover, and bid her good-bye for two days. Then we raise the cover and take her out (she would stay on longer if permitted). See that she has plenty of feed and drink, put another handful of ashes on the eggs, put the hen on again, and cover her up. In this way we succeed in keeping a hen sitting for two or three months. Our nests are placed in dark places, which, we think, makes it easier to accomplish the above.

The tansy and ashes placed in the nest tend to keep off lice, but are not warranted. Eight days before the hen is to come off, we sprinkle the eggs with cold water when she is off the nest feeding; this prevents the eggs getting too hot and the chickens dying in the shell.

We are not bothered much with the gapes. We have lost but one chicken with them, and his head was cut off to help him along, so he did not die of gapes. We try to prevent, but not to cure. Large quantities of black and red pepper are mixed with their food two or three times a-week.

During 1870 we were troubled with cholera in our fowls, losing some twenty; this year we have lost none. Our preventive is alum,

two or three times a-week, in their drink. Our chickens sometimes get crop bound; we succeeded in curing one very valuable one by cutting open his crop, taking out the hard mass, sewing the wound, and feeding on soft food for two or three days.

One word about ducks, as everybody declares that they eat their heads off. We commenced on a small scale, not having any old ones. Result:—

| | Dr. | Dol. | Dol. |
|---------------------------|-----|-------|-------|
| To 250 eggs, | | 6.00 | |
| „ feed, | | 20.25 | |
| | | | 26.25 |
| | Cr. | | |
| By 35 ducks sold, | | 22.04 | |
| „ feathers, | | 1.50 | |
| „ 35 ducks on hand, | | 17.50 | |
| | | | 41.04 |
| Total profit, | | 14.79 | |

We have had what we consider bad luck; we bought 250 eggs, nearly three-quarters of which were bad and did not hatch.

The feed for our 900 chickens and the eggs for hatching the chicks have cost 157 dols.—about 17½ cents each. We generally calculate that their manure will pay for all the labour in hatching and rearing. We have also tried an experiment in fattening fowls. We put 60 chickens in our corn-crib and fed eight days on corn. Result:—

| | |
|--|---------|
| Weight when taken out, | 250 lb. |
| do. do. put in, | 227 |
| Gain on the 60 fowls, at cost of 7 cents per lb. | 23 lb. |

The Apiarian.

THE PASTURAGE OF BEES.

s excellent little "Handy Book of Bees," published by the Messrs Black & Sons, Edinburgh, Mr Pettigrew, the following interesting and instructive remarks:—

Bees in early spring receive great attention from bees. Much pollen and some honey are collected from their flowers.

In some places there are two kinds of *Salix* which bear yellow flowers, very conspicuous, in early spring, which are much visited by bees.

Order hyacinths of our gardens—their flowers are forced to decorate and scent our conservatories—furnish bees with many a fruitful mouthful.

Wallflowers—grown largely in some places for cut flowers and seed—are excellent for bees.

Flowers of gooseberry and plum trees are excellent, yielding honey of the greatest quality in great abundance:

Pear, and currant trees are also of great use to bees, furnishing the bees with large stores of honey. Cherry, and apricot are honey-yielding plants. Mustard (*sinapis arvensis*), which is a preponderant in some districts, freckling our corn fields with its yellow blossoms, is an invaluable thing for bees. In the north this plant is called *ketlock*, in the north-west it is called *skellock*, and in the north-east it is termed *ranches*. Here, in the north-west and Cheshire, it is called the *flower*. It continues a long time in flower, and the honey gathered from it is very excellent. The flowers of turnip, and all the brassica tribe, are extremely tempting to bees, and yield them much honey.

The flowers of turnip, and all the brassica tribe, are extremely tempting to bees, and yield them much honey.

Field-beans are about as rich in honey as they can be—rich in quantity and rich in quality. There is some mystery as to the means employed to extract it from the flowers of beans, which are tubular in shape, and of considerable thickness. The honey, of course, lies at the bottom of these flowers—deeper than the length of a bee's proboscis. The tubes are pierced or tapped near their bottoms, and through the holes thus made the bees extract much rich pasture. It has been said that bees are unable to pierce the tubes of the flowers, and that the holes are made by humble-bees, which have greater powers. No one can watch humble or earth bees at work in a field of beans, and remain in doubt that they do some work in this way. They do push their trunks through the petals of the flowers with a view to reach the honey; but the question is, Can bees make holes for themselves, or do they merely make use of the holes made by humble-bees? We have never seen a honey-bee make a hole through the petal of a bean-flower; but from the scarcity of humble-bees in some neighbourhoods where bean-flowers are found well pierced, we are ready to believe that the "jimmies" of our own friends are used for breaking through the thick walls of bean-flowers.

Maple, sycamore (or plane), and lime trees are of great value to the bee-farmer. Maples are not so abundant in this country as sycamores and limes. Honey is not distilled from the flowers of the sycamore, but it literally lies on them, and is clammy and sticky to the touch of human hands. Elsewhere we have said that the honey gathered from the flowers of sycamore and gooseberry trees is of a sea-green colour, rich and highly flavoured.

that it is called in Scotland "heather-honey," while all the rest is termed "flower-honey."

It need not be said that plants grown on warm well-drained lands yield more honey than those grown on cold heavy soils. Even in the case of heather this is true. In ordinary seasons, heathery hills yield more honey than heathery swamps. And the good sense of every bee-keeper will tell him that

hilly exposed pastures and districts are, in showery seasons, much better for honey than flat and sheltered ones. We have known hives placed in hilly districts increase greatly in weight in such seasons; whereas those standing in low sheltered places could scarcely keep themselves, the flowers being hardly ever dry. In very drougthy seasons the low sheltered parts may be the better of the two for honey-gathering.

The Naturalist.

A MONSTER STURGEON.

MR W. B. TEGETMEIER, a very good judge of poultry, thus writes to the *Field* upon an ichthyological subject :

During the past week a sturgeon, the largest I have ever seen, has been on view at Messrs Grove's, the well-known fishmongers, 150 New Bond Street. The animal was captured in the Hampshire Avon, near Christchurch, by Mr Coates.

It is unusual to find large sturgeon in the rivers running into the English Channel, they being much more frequent in the rivers of Scotland and Ireland. This renders the occurrence of one of such exceptional size the more remarkable. I carefully measured this specimen, and found its extreme length to be 117 inches = 9 feet 9 inches. The head alone, measured from the tip of the nose to the posterior margin of the gill cover, was 22 inches, and the girth around the thickest part of the body 3 feet 9 inches.

Yarrell, in his "History of British Fishes," enumerates a few of the largest sturgeons on record. He says that "one was caught in a stake net at Findhorn, in Scotland, in July 1833, which measured 8 feet 6 inches, and weighed 100 lbs. Another, recorded by Yarrell, was caught in the River Sever, near Shrewsbury, in 1841, which measured 10 feet 6 inches, and weighed 120 lbs. The largest sturgeon on record was caught in the River Rhine, near Bonn, in 1825, which measured 14 feet 6 inches, and weighed 200 lbs. The sturgeon which I have just mentioned, measured 117 inches, or 9 feet 9 inches, and it is the largest I have ever seen." Mr

Stirling's specimen should be regarded as "angler's weight."

When in the ocean the sturgeon inhabits deep water, feeding on crustaceans, fish, and vegetable matter; hence they are generally safe from nets, and are rarely taken, except when they enter rivers for the purpose of depositing their spawn.

The fish varies much at different ages, and consequently the determination of the different species is very difficult, as well as most unsatisfactory.

Yarrell informs us that:—"In the time of our first Henry the sturgeon was reserved for the King's table, and even in the present day, when one is caught in the Thames within the jurisdiction of the Lord Mayor, it is called a royal fish, implying that it ought to be sent to the Queen.

On the 28th of May last, the following letter was addressed to the editor of the *Times*:—

Sir,—Would you be so kind as to give me any little information through your valuable paper about the following.

On Friday I bought from a fisherman here a sturgeon, weighing some 50 lb. or 60 lb. I exposed it for sale in my shop, and in the course of the afternoon, about five o'clock, the superintendent of police, with two constables, came to my shop demanding the fish, saying it ought to be given to the Mayor or offered to the public. I objected to them taking it away, but it was no avail; they came into the shop and carried it off. Have you any knowledge of any other case of the kind, or do you think they were justified in taking it away? I have offered and exposed for sale a great many sturgeons, but this is the first time they have ever taken such a thing in this town. Trusting this will not give you any inconvenience.—I am, Sir, yours obediently,

T. T. SAMPHRE.

141 Norfolk Street, and 29 Chapel Street, King's Lynn.

As far as I am aware, no explanation of this extraordinary proceeding has been offered. The skull of the sturgeon in the skin is very often preserved in our museums ; but on the cartilaginous character of the bones, the skull itself is very seldom mounted. I may therefore be excused for calling attention to a magnificent preparation in the Museum of the Royal College of Surgeons in which the soft parts of the framework are modelled and replaced. It is, in fact, the only preparation that I have ever seen that shows perfectly the osteology of the skull of a large cartilaginous fish.

The Country Gentlewoman.

MY IN-DOOR BRITISH FERNERY.

THREE years ago I had a lean-to house built, 43 feet long and 12 feet wide, one end of which (about 15 feet) is shaded by the dwelling-house. On account of the want of sun I found that the plants did not thrive so well in the shaded end of the house as they did in the other.

Two years ago, being desirous of making a collection of British Ferns, I paid a visit to Devonshire, where I was fortunate enough to get some beautiful kinds. When I came home I thought it was a pity to have such a number of nice Ferns and no place to plant them where they would be seen to advantage, I mean on rockwork, as I think Ferns do not look so well grown in any other way.

The partition and door are of glass. Around the door I formed an arch of Virgin Cork, in which pockets were made and filled with Ferns, Echeverias, and Ivy. When you enter the door the highest part of the house is at your right hand, and the path next the wall. I intend to cover the wall this season with virgin cork, with pockets similar to that of the archway. As you enter on your left a raised bank runs along that side of the house, and across the end is a sloping bank, composed of flints and burrs. The centre of the upper part of this bank sweeps to the left, and in the centre of the lower part is a basin, 4 feet long, 2 feet wide, and 6 inches deep; round the basin are planted various Grasses and Ferns. In the corner of the house is a little fountain.

The part of the house is not heated; but the part of the door is open (which it is

all winter), the temperature is never lower than 50 deg. or 55 deg. in the day, and 45 deg. at night, which keeps the Ferns green all the year round; but when the young fronds are coming up, I cut off the old ones, as they are liable to push the young fronds out of shape. The bank on which the rockwork is built is made of loam, leaf-mould, coarse sand, and a little peat. Now that the roots of my Ferns have got well into this mixture, they are throwing up young fronds very strongly. In winter I give the Ferns, &c., water now and then when the weather is mild; but, of course, they do not require very much, as it is not their growing season. In the spring I syringe them once a-day, and now (May) I shall syringe them morning and evening. On fine days I leave the entrance door open from about nine in the morning till four in the afternoon, when I syringe and shut up for the night, but in summer you can hardly give too much air and water overhead and at the roots of your plants. I like it best for houses that are not supposed to be very ornamental, as after your house is syringed, if you run a few cans of water over it and brush it out, it always looks clean and fresh. When the Ferns and other rock plants are in full perfection in summer, and the little fountain playing, with gold fish darting about in the water, my Fernery looks very pretty. Any one who may have some house in which other kinds of plants will not grow well, or who may have some old neglected ones in the corner of their garden, may make a very pretty and effective British Fernery of it if they will only use a little taste and lay out a very small sum. Mine quite repays me for my trouble, time, and expense.—A. H., in the Garden.

HOW WAX FLOWERS SHOULD BE GROUPED.

That little excellent treatise on "Wax flowers," written by our esteemed correspondent, Miss Williams, and published by Fry, Evans, & Co., there is an excellent

produce that engraving to shew such of our readers as may be interested how graceful-like a group of flowers may be arranged upon a drawing-room mantel-piece or stand. Here,



Design for Grouping Wax Flowers.

ation on the frontispiece of how wax
rs, after they are made, may be arranged.
the permission of the authoress, we re-

in the centre, is a spike of *Ixia* towering above
its companions, relieved with a sprig or two
of *Pteris serrulata*. On the prominent side

of the centre-piece is a flower of that most appropriate of all flowers for imitating in wax—*Lycaste Skinnerii*. Under that, again, is a *Camellia*, with its shell-like petals standing out in relief, flanked on the one side by a *Lilium* of the spotted lancifolium kind, by a graceful *Fuchsia*, with its flowers drooping down as if the bouquet was *en deshabille*, but really adding to its ease and effectiveness. On the other side is a Rose—a beautifully cupped Rose of the Jules Margottin style, so captivating from its texture and general build, and so wondrously sought after for its fragrance—but, alas! it has no smell—it is modelled in wax. Perfect-like though it be, it is only a wax flower, but so well done, in good hands, that it might be a fair apology for the remark of the uninitiated in matters of flowers, that the flower upon which she was looking was as “perfect as if it had been made in wax!”

The whole are so grouped as to form a pattern-set for any who choose to take lessons in the arrangement not only of wax, but of all kinds of flowers that are placed in vases for house decoration.

All the groups, after they are arranged, should be placed upon a handsome stand, and enclosed in the area of a glass shade. It prevents them from being injured by rude

hands, and adds much to their general appearance. These shades, to be effective, should always be narrow and long. It does not accord well with the principle of the art to attempt to crowd a great many flowers together. A crowded style of arrangement, particularly for artificial flowers, is bad. We therefore commend Miss Williams' method of grouping to the notice of all who are learning the art. A few flowers well arranged and easily put together, is what always should be aimed at. In these days the flowers in the greenhouse or the flower border look infinitely better if they be put together by contrast without the one disturbing the position of the other. That is why wiring is so effective, and why it should always be preferred to any other mode of assorting flowers. In putting them, the one to contrast, or in colour, one towards another. We trust that the lessons we would endeavour to inculcate will not be lost upon such as are anxious to be taught. We are aware that many of our readers are well up in these matters already, and we know that from them we shall get a patient hearing. It would be well if a few of the successful bouquet artistes would give us an occasional letter for the benefit of the many who are anxious to learn.

THE COUNTRY GENTLEMAN'S MAGAZINE

SEPTEMBER 1872

THE ROYAL AGRICULTURAL SOCIETY AND LIBEL.

THE Royal Agricultural Society of England, in its laudable endeavours to promote and protect the farming interests, has often a delicate and a difficult task to perform. Sometimes the duties are even more than difficult—they are dangerous. The Society was established for the purpose of conferring a boon upon agriculturists, by helping in every possible way that could be thought of the advance of scientific agriculture. To their large constituency the Council are in duty bound to leave no stone unturned to clear away every obstacle that exists interfering with the thorough cultivation of the soil and the proper rearing and feeding of stock. By liberal prizes offered at annual exhibitions, the Society has marvellously improved the breed of cattle; by encouragement to implement-makers, the latter perhaps not so liberal as it might be (at least, so is said by some), they have succeeded in bringing wondrous improvements made in all instruments and machines calculated to better tillage, reduce manual labour, and cut or increase and harvest the produce of the ground. Progressing in their scheme of beneficence, they have thought it right, and properly so in our idea, to invade territories where abuses are well known to exist—all, be it remembered, in the interests of the great class they represent, and with whose welfare that of the general community is intimately associated. If a farmer has to pay more for his whistle by 20 or 30 per cent, say, than that the whistle is worth, and if it should happen, as

VOL. IX.

it does sometimes, that the whistle he buys will not even sound, though he blow until he is black in the face—an exercise not conducive to health—then, although the husbandman is the direct sufferer, indirectly the public are aggrieved on account of the high expenditure on an ineffective instrument.

To drop allegory: if a farmer purchase manure at a certain price, on the understanding that it is worth the money, and finds, when the time comes, the joyous reaper should be bearing "the harvest treasure home," that there is little corn to carry, owing to the adulteration in the manure, which he had been assured was genuine, pecuniarily he does not suffer solely—consumers of bread are penalized with him. His, no doubt, is personally the keenest annoyance, but buyers of corn have to pay dearer on account of the small crop resulting from the application of the stuff supplied by fraudulent vendors. Again, in the case of feeding-stuffs, when stock-owners are swindled, the loss does not altogether fall upon themselves. If cheap, nasty, and even deleterious matters supplant the pure linseed-cake, and cattle and sheep deteriorate and die in consequence, the price of beef and mutton is enhanced to the buyer. In the present condition of our stock-markets, and the exorbitant, almost prohibitive, price of beef and mutton, there is little need of trickery of a nefarious character being exercised, either in fertilizers or condimental foods.

Not alone farmers, but the general public,

L

should assist the Royal Agricultural Society of England in its endeavours to nail, as gamekeepers nail the heads of vermin to the door, all who, professing to sell a good article for corn or roots, palm off one that destroys rather than increases the value of the crops; and feeding-stuffs which, instead of fattening animals, secure only emaciation and death.

The Royal's lines, like those of most pioneers in good work, have not fallen in pleasant places. Since they began boldly to give, with names attached, the results of special analyses, they have been subjected to two actions of libel, in both of which they were mulcted in nominal damages carrying costs. Notwithstanding those losses, we are certain that the members will not grudge the money coming out of the funds for the purposes of the defence, nor cash to enable the Society to carry on, as they have been doing lately, the publication of names. The service they are rendering to agriculture by so doing cannot be over-rated. The reports of the trials in which they failed prove that their inquiries and their operations were not unneeded. Take for instance the following evidence given by Mr Ayre, who sold a cake that was complained of, and the subject of action at Leeds last week as reported in *THE FARMER* :—

Mr Ayre, in examination, said that they had never made a secret of there being *sesamé* and bran in the cake, and Mr Wells was aware that it was a mixed cake.

Mr Field : As you were so anxious to tell everybody

that your triangle cake contained *sesamé* and bran, why didn't you mention it in your letter to Mr Wells?

Witness : Because we did not find it necessary to do so.

Mr Field : You sent a letter along with a circular to Mr Wells; why did you not mention it in your letter?

Witness : Because we took it for granted he knew what cakes he was buying.

Mr Field : You offered him triangle best linseed. Is it best linseed with 50 per cent. of bran and *sesamé*? Is that linseed?

Witness : That's triangle best linseed cake.

Mr Field : Is it linseed cake at all?

Witness : I should say yes.

Mr Field : Half of it being bran and *sesamé*, you say it is a linseed cake?

Witness : I say that the trade treats all those as linseed cake.

Mr Field : I know the trade treats it so, and that is the reason I am here. Why didn't you put it on your circular?

Witness : We can't put everything on the circular.

Mr Field : It would not be very long to say 50 per cent. is *sesamé* and bran; it would not take very much printing that.

Witness : A baker would not state the number of currants he puts into a cake.

Mr Field : Why didn't you put it on this (holding up the circular).

Witness : Because it is unnecessary; it is well known throughout the trade.

This little bit of information about the "tricks of trade" is itself worth to farmers ten times the amount of penalty and costs in which the Royal Agricultural Society was involved in eliciting it. We trust the Royal will be encouraged to continue its good work, undeterred by anything that has passed in the Law Courts.

A PEEP AT SCOTLAND.

SOME very interesting statistics are furnished in the first volume of the Census of the Population of Scotland for 1871, which has just been issued. Before quoting any of these, we may note that the reports seem strongly imbued with a hatred of the Irish race. The invasion of Scotland by the Irish within the last fifty years, and especially since the potato famine, they are apt to think an unmitigated evil, and express their feelings rather more strongly than seems becoming in a Parliamentary book regarding a race which forms an integral portion of the United Kingdom.

The invasion of Irish is likely to produce far more serious effects upon the population of Scotland than even the invasions of the warlike hordes of Saxons, Danes, or Norsemen. Already, in many of the towns do the persons born in Ireland constitute from 5 to 15 per cent. of the population; and, if we include their children born in this country, from 30 to 50 per cent. of the population of these towns is of the Irish Celtic race. The immigration of a body of labourers of the lowest class, with little or no education, cannot but have most prejudicial effects on the population. As yet, the great mass of these Irish do not seem to have improved by their residence among us; and it is quite certain that the native Scot who has associated with them has certainly deteriorated. It is painful to contemplate what may be the ultimate effect of this Irish immigration on the morals and habits of the people, and on the future prospects of the country.

There is, no doubt, some truth in what is stated, but it need not have been quite so fully expressed. And it should not be forgotten, by farmers at least, that before the time of reaping machines "the Green Isle men" could ill have been spared at any time. There were lots of black sheep to look after; men who would stay, for a week or so free on one farm, waiting for the ripening of the corn, and then, when their services were required, leave for every part of the country where the "port," wages, were better. Being so disposed of the insinuating and

productive, and threatening to be inimical, population of the Emerald Isle in their relation to Scotland, the reporters tell us the following facts concerning the number of persons to each acre in Scotland, and shew us the character of the distribution, which, in view of certain measures in connexion with land-tenure, sure to come on next session, are interesting:—

Comparing the population with the area of Scotland, it would appear that in 1871 there were in the proportion of 110.30 persons to every square mile, or 5.80 acres to each person. Of course the proportion varied in the eight divisions of the country. Thus:—In the North-Western Division, which contained the smallest proportion of inhabitants, there were only 22.75 persons to every square mile, or 28.13 acres to each person. In the Northern Division there were 35.99 persons to a square mile, or 17.78 acres to each person. In the West-Midland Division there were 59.23 persons to a square mile, or 10.81 acres to each person. In the Southern Division there were 64.68 persons to a square mile, or 9.89 acres to each person. In the North-Eastern Division there were 104.24 persons to a square mile, or 6.14 acres to each person. In the East-Midland Division there were 134.80 persons to every square mile, or 4.75 acres to each person. In the South-Eastern Division there were 253.43 persons to every square mile, or 2.53 acres to each person; while in the highly populous mining and manufacturing South-Western Division there were 516.30 persons to every square mile, or only 1.24 acres to each person.

If we take the individual counties, the disparity of population to area appears still more strongly. Thus:—

Five counties had only from 12 to 40 inhabitants per square mile, viz., Sutherland, 12.89 persons to a square mile; Inverness, 20.57; Ross and Cromarty, 25.70; Argyll, 23.25; and Peebles, 34.63 persons.

Five counties had above 40 and under 60 persons to each square mile, viz., Kirkcudbright, 43.89 persons; Nairn, 47.60; Perth, 49.12; Selkirk, 53.83; and Caithness, 56.17.

Six counties had above 60 and under 80 persons to a square mile, viz., Dumfries, 67.82 persons; Shetland and Orkney, 67.22; Bute, 75.45; Wigtown, 75.79; and Berwick, 78.58.

Five counties had above 80 and under 100 persons to a square mile, viz., Elgin, 82.09 persons; Roxburgh, 80.62; Kincardine, 89.27; Banff, 90.38; and Kinross, 92.48.

mense extension of building in all our towns has taken place ; and the tenements built for the labouring classes have been so constructed that each contains, according to its size, from four to eight separate houses, of two or three rooms each, with closet, in which is sink, water, &c., letting annually from £8 to £12. Such, generally speaking, are the houses raised for the labouring classes ; but we have yet to learn whether it is a fact that that kind of house either gives more breathing space to those who live in it, or whether the sexes are thereby kept more apart than when the same class lived in their one or two rooms.

It was above shewn that each so-called house in the towns had a proportion of 12.2 persons to it, while each house in the villages only had 5.8 persons, and each house in the rural parts 5.3 persons—that is to say, that to every ten houses in each group, there were 122 persons in the towns, 58 persons in the villages, and 53 persons in the rural districts. If “a house” meant the same thing in the towns as in the villages and rural parts, the above figures would shew that more than double the number of persons lived in each house in the towns to what lived in each house in the villages and rural parts. But it appears that every ten houses in the towns contained seventy-three rooms, while every ten houses in the villages and rural districts contained only thirty-four rooms ; so that the room accommodation in the towns and villages were equal, being ten rooms to every 17 persons.

This striking fact shews that mere generalities will lead us to no practical conclusions relative to the housing of the population, or their overcrowding ; but it effectually disposes of the cry so often raised erroneously, that the towns are in a much worse condition as to room accommodation than are the villages or rural parts of the country.

The proportion of families inhabiting houses of different sizes differs in each county. For instance, only 17.53 per cent. of the population in Kincardine lived in houses of one room ; while in Renfrew 36.50 per cent., and in Lanark 42.74 per cent. of the

population lived in houses of the same size. Over the whole counties the proportion was much more uniform who lived in houses of two rooms—varying only from 30.13 per cent. in Elgin to 48.35 per cent. in Orkney. Of all the counties, however, Shetland had the smallest proportion living in houses of three rooms, viz., only 3.56 per cent. But 21.89 per cent. of the population in Elgin lived in houses of three rooms, and 23.16 per cent. in the county of Banff. Even the county of Edinburgh had only 11.79 per cent. of her population in houses of three rooms, while Lanarkshire had only 9.97 per cent.

As might have been expected, Shetland had by far the highest proportion of her population living in houses of one or two rooms with or without windows—90.24 per cent. of her population being in that condition ; and she had also the highest proportion of her people living in huts, or houses without windows, seeing that 8.35 per cent. of her families were in that condition. So many crude and unsupported theories are now brought forward and proclaimed as facts, that it seems right to mention that the mere circumstance of Shetland being the worst housed of all the counties of Scotland has not had the effect of either making her the most unhealthy or the most immoral of the counties. So much is the reverse the case, that she stands pre-eminent for the healthiness of her population, and also for their morality ; which leads us to conclude that house accommodation is only one of the causes, and after all perhaps not one of the most important, which affect the healthiness and morality of a people.

The report at which we have just glanced is an extremely interesting one, and cannot fail to assist all who are anxiously striving to understand the anomalies of our social system, the condition of our agricultural population in particular, and how best to improve their house accommodation in order that this may tend to greater comfort and morality.

VETERINARY DEPARTMENT AND FOOT-AND-MOUTH DISEASE.

THE Report of the Veterinary Department for the year 1871 has at length put in a tardy appearance. The figures it gives, with reference to the amount of disease in the country last year, have already been made public, at various times, through the columns of the newspapers. There are several points in the document which we may probably direct attention to on a future occasion. Meanwhile, we notice that Dr Williams does not appear to think that foot-and-mouth disease is, after all, so very serious a matter, which is a very different opinion from that held by the Central Authority of Norfolk, who deem it much more inimical to stock than the rinderpest ever was. Dr Williams also appears, at the time of writing, to have been unaware of the very violent type the disease has now assumed. Dr Williams, as will be seen, does not seem to approve of the stoppage of markets and fairs for a period, as recommended by the Norfolk authorities, in order that the disease might be effectually stamped out.

With reference to the Act of 1869, as it relates to foot-and-mouth disease, the head of the Veterinary Department remarks:—

The general objection made to the present restrictions by the Chambers of Agriculture and the local authorities is that they are not sufficiently stringent and that it is necessary to take more action should the disease be taken.

received information of 92,162 outbreaks of foot-and-mouth disease, in which 1,344,625 animals were attacked. Of these, only 1.136 per cent. died, .327 per cent. were killed, and 98.537 per cent. recovered. The per-centage of deaths as indicated by these returns is very low, but even this is said to be much higher than it should be, on account of the want of proper treatment.

Contrast this with cattle plague, in which the cattle killed were, in its last visitation, upwards of 36 per cent. of those attacked, the deaths amounted to nearly 49 per cent., and only 15 per cent. were recovered for our use.

It does not appear, however, that anything short of stopping all markets, fairs, exhibitions, and sales of animals, and putting severe restrictions on their movements, would eradicate this disease even for a time. To do this effectually would also necessitate the appointment of veterinary surgeons in each district, would entail considerable expense, and would afford no security against future outbreaks.

Their Lordships were of opinion that these stringent measures, although submitted to for the purpose of stamping out cattle-plague, would not be borne in a disease which is so rarely fatal as foot-and-mouth disease.

Some farmers indeed do not appear to believe that this disease is spread by contagion, or if so, do not consider it of sufficient importance to take the simplest precautions against its introduction and spread.

The objections which appeared to apply to placing additional restrictions on the home trade apply equally to the Irish and to the foreign trade; and the proposal to slaughter all foreign cattle at the landing places has the additional objection that, by reducing the price which the cattle would fetch, it is more than probable that such course would have the effect of checking the importation of the comparatively healthy foreign cattle which have formed upwards of 72 per cent. of our total import.

The objections to quarantine, except when advanced on the ground that it may be taken of the detention for the purpose of weakening the animal, appear to be the expense and the interference with trade, both which items would tend to increase the cost of production and therefore the price of it. The tendency of this would be to stop foreign importation, as it has been stated that a difference in price of from 5s. to 10s. per head would be sufficient to stop all the foreign cattle from coming to London.

*THE ACCOMMODATION OF AGRICULTURAL LABOUR
IN THE NORTH.*

THE conversion of small and middle-sized farms into one farm or tenancy in the north, though beneficial in improving cultivation, and increasing the produce of the soil, had not a good effect on farm servants. It may have been instrumental in giving them higher wages, in securing for them more regular as well as shorter hours of labour, and, in some measure, lighter work, but in addition to the placing of land tenancy practically beyond their reach, larger numbers were necessarily employed together, which was anything but conducive to their moral and social well-being. The accommodation for the servants on the more recently enlarged farms was long inadequate. In fact, in some cases the servants were huddled together almost like so many pigs, and, being thus isolated from the more refining agencies of society, some of them gradually acquired boorish and unbecoming habits.

The cottage system of hiring farm servants is now universally preferred both by masters and men, but a difficulty arises on some estates as to whether the landlord or tenant should provide the accommodation. Defray the cost of erection who may, it is evident the number of cottages for farm servants will soon be largely increased in the northern counties of Scotland, and such an improvement cannot, both in the interest of masters and men, come a day too soon. On several estates in these counties, notably the Duke of Richmond's, a considerable number of cottages have been erected lately, but much remains to be done in this direction. In the farther inland districts, and on the smaller farms in the lowlands, the servants are boarded in the kitchen. This custom involves rather less freedom to both parties than the bothy does, but all things considered, we think it preferable. The bothy,

the kitchen, and the cottage in operation. In a word, cottage for married servants, for those unmarried.

In the counties of Aberdeen and Nairn, the more common engaging has for many years been the hiring market. A few of the cottages have all along been engaged for the market-day, and latterly a number have, in a small way, been of their services; but still they delay till the market. I have never been so numerous in Abernethy, Ross, Sutherland, as in the counties named, where a greater proportion are private. The wages of ploughmen range from £40 a-year in the northern counties to the qualifications of the man, and the amount of responsibility and the steady industrious single ploughman. These wages, can easily save a man and a married man with a small family comfortably if the house accommodation is good, but if he has a large family he would strongly recommend a little more of wages for ploughmen.

The results is commendable in the case of masters, there is stronger feeling in the case of ploughmen and labourers, for the nature of the work enables the efficiency of the man to be more easily ascertained than in the case of females. Females employed in agriculture are inadequately remunerated. They do not receive more than about half the rates paid to men. This is it should be. Women should receive more than half the wages paid to men. I would recommend a little more proportion, believing, as we

increase, 20,028 bushels. Beans, millet, and sorghum, 173,217 bushels; increase, 99,768 bushels. The only decrease under the head of grain crops is in the item "rye and bere," the production of which has fallen from 14,856 bushels in 1871, to 8496 bushels in 1872. The total produce of grain had increased from 5,456,577 bushels to 8,348,736 bushels, a difference of 2,892,159 bushels. In green crops, exclusive of those in market and kitchen gardens, there had been an increase of 8985 tons; the totals for the two years being 150,108 and 159,093 respectively. The production of hay had diminished from 183,708 tons in 1871, to 144,637 tons in 1872. In tobacco the increase had been very

marked, the return for 1871 giving only 467 cwt., while the production in 1872 reached 2307 cwt. The yield of grapes had increased by 12,749 cwt., and the production of wine by 84,370 gal., the returns shewing 713,589 gal., as against 629,219 gal. Of brandy, 1579 gal. had been manufactured, as against only 73 gal. during the former period. With reference to the vintage, the acreage, number of vines, &c., are for the year ending March 31, 1872; the quantity of grapes gathered and of wine and brandy made are for the previous season. The grape crop comes in too late to admit of its being returned when the agricultural statistics are collected.

AGRICULTURAL LEASES AND LAND TENURE.

By Mr FORD.*

THE subject under discussion is one of great importance, and I believe it will require no pains on my part to substantiate this fact; for, with what we have lately learned concerning the growing population of this country, its increasing wealth, its thriving trade and commercial prosperity, and the continually enlarged demand for the necessities and even the comforts of life proceeding from our industrial classes, the paramount necessity of a higher system of agriculture, and a larger outlay of capital to assist in the cost of an increased production, cannot fail to impress itself upon us; and what is of infinite consequence, when viewing the subject in this respect, is a better defined understanding between the proprietor and occupier of the soil.

CAUSES OF THE INCREASED DEMAND FOR NECESSITIES.

Before I proceed to dwell upon what, as I conceive, should be the relations between

* Paper read before the Boroughbridge Agricultural Society.

landlord and tenant, permit me to glance for a moment at the causes which have tended to bring about this enlarged demand, and which have in so great a degree produced such changes as we now see in our social economy. First, the increasing wealth of the country will be found to have exerted the greatest influence. The enormous export trade and home consumption in almost every branch of industry has caused such an extraordinary demand for labour that the requirements of manufacturers can scarcely be satisfied. The price of labour, as a necessary consequence, has largely increased; while the working classes of the country have protected their interests by such combinations as trades unions. The effect of these unions has been largely to increase the cost of production; for while artisans in all branches of trade have by their protective influence been enabled to hold out and bide their time, employers of labour have been compelled to make very large concessions. Wages have therefore continued to rise—the standard of living among the working population

and unsuited to the exigencies of our
 We want a more commercial spirit
 into the transaction. We will as-
 hat a landlord has found, as he be-
 a suitable tenant, and the seeker of
 is found both a good farm and a reput-
 od landlord. And let me here re-
 at, under a system such as I would
 te, great caution is required in the
 n of a suitable tenant. When the
 ons of a lease or agreement are under
 ration between them, it should be the
 our of the landlord, or his agent on
 half, to let the land on principles of
 ctest equity, bearing in mind that it
 livelihood that the tenant may be as-
 to have become the hirer of the
 He should impose no antiquated or
 tipulations or burdens, such as are
 nes handed down in farm agreements
 ither to son, but which, to an en-
 ed and trustworthy tenant, become
 and oppressive, but should leave the
 as free and unfettered as possible.
 pping clauses should be abandoned,
 y stipulation being that the land be
 an and in good condition. If a land-
 es over his estates, and takes note of
 ps on his various farms, it will be a
 iterion (though by no means an absolute
 on) of how the land is being farmed;
 ot able to form a judgment for him-
 re are generally those in his employ-
 ho are quite competent to advise
 ietor of how his land is being culti-
 But in the event of a divergence of
 as to management, or other dis-
 should be arranged to have it set-
 arbitration, the arbitrators to be
 y agreed upon, with an umpire if so
 l. This is a better mode of dealing
 ch differences of opinion, than by
 it to the decision of an agent or
 man, who is frequently incapable of
 to an impartial judgment, and,
 capable, might naturally be supposed
 the landlord's views of the matter in
 The tenant, again, should be careful
 sign any clauses which he has any
 n as to his power or intention to

fulfil. It is bad management to run any
 such risk, or to lay himself open to penalties,
 trusting to "chance" or to its "all coming
 right in the end." In the next place a
 tenant must assure himself that he is abso-
 lutely and without reservation, politically free.
 But I now pass on to another topic, which
 is one of very great interest to farmers. If
 the proprietor of an estate is a sporting man,
 I cannot conscientiously advocate the prin-
 ciple that he should, under any agreement
 whatever, be deprived of the right and plea-
 sure of sporting over that estate, although
 some have argued to the contrary. But I
 do not conceive that this society would
 give its sanction or approbation to
 any such arbitrary arrangement. But
 in such cases where a tenant has not
 the right of shooting (and if the landlord
 does not reserve the shooting for himself
 then I must affirm that his tenants should
 have priority of claim, even though they paid
 a trifling acknowledgment for the privilege,
 for I cannot admit the justice of preserving
 game in order to let it to a stranger, for the
 emolument of the landlord at the expense of
 the tenant)—but in cases where the landlord
 reserves the shooting for himself, it would
 not only be a graceful act but often a con-
 ciliatory one, if at times the tenants were
 invited for a day over the stubbles or in the
 covers. It should not be forgotten that both
 winged and ground game are maintained
 entirely by the cultivator of the soil. The
 destruction of rabbits, by whatever means,
 should be a *sine quâ non* with a tenant, and
 hares should be kept within strict limits.
 There is, however, now a prospect of some
 relief for farmers in the matter of game.
 The Game-laws Select Committee of the
 House of Commons are at present sitting
 and taking voluminous evidence, and it is to
 be anticipated it will operate beneficially to
 agriculture.

A LEASE AND TENANT-RIGHT.

If land must in the future be brought to
 the maximum of cultivation, and the require-
 ments of generations yet to come are to be
 satisfied, there can be no doubt that many

of purpose of landowners as a body. It must be remembered that life is uncertain; there is no security for a man that he will walk in the same path as his father. It is absolute security that the farmer must have before agriculture reaches its highest development—a security that will be tenable against the contingencies of life and death, or the caprices and influences of human nature. It is frequently in defence of the system of yearly leases that such and such districts or parishes are stated to have been held on no other terms, and that they have exhibited an increase and improving tenantry. This is stated; but it may be said—give the tenants of men ample security for their tenure, and you will see how much more will be done. There are not good landlords, though it might with truth be said that this country is full of men with very many high-minded men, who have the interests of their tenantry very near their own hearts; but that the capital of the tenant-farmer, which may be locked in the hands of a bigoted and narrow-minded landlord, is a state of things which calls loudly for reform, and which must before very long be reformed. It has been thought to be impossible to apply legislation to the relations of landlord and tenant; but few, I think, will deny that we are rapidly approaching the time when legislative protection will be the order of the day in English agriculture. Such protection should not, I trust it never may, dissolve those bonds of natural esteem and affection which happily reign between so many landlords and their tenantry. It should rather be the means of creating

a better feeling than that which may sometimes be found to exist; and, looking at the question in its broadest aspect, it almost ceases to be an individual one, for it is a grave national question, one upon which hinges the incentive to a more commercial, and in consequence, a more enlightened treatment of the soil of this country. I am no advocate for fixity of tenure in its full scope and bearing. By such a system landlords would lose what it never can be expected they will consent to abandon, viz., a control over their properties, and it would result in their losing all interest in the improvement and development of them; or it might develop itself into such a condition of things as exists in Ireland under the operations of the Land Act, where landlords are paying enormous sums amounting in one instance to about forty years' purchase of their properties as compensation to ejected tenants, and with no right of appeal. Such cases, I hear, are not unfrequent. In conclusion, we may congratulate ourselves upon having seen very vast improvements in our own time, due mainly to the energy of the tenant-farmer, and the skill of the engineer and mechanic; but let us also see some of those changes which I have ventured to advocate in the relations of the proprietor and cultivator of the soil, and, great as are the resources of the country—great as are the spirit and enterprise of the agricultural community of this kingdom, agriculture will yet rise to a degree of perfection hitherto unseen, when the natural produce of the soil of the country will be very largely increased, and when every waste place will blossom as the rose.

ANOTHER SUCCESSFUL SEWAGE FARM.

THE Welsh, equally with the Aberdonians, have been successful in their application of sewage to farming purposes. The Merthyr sewage farm has frequently been instanced as an example of the systems of intermittent downward filtration and irrigation, and the Royal Agricultural Society did not lose an opportunity, which was offered them last week, of visiting the farm. On Thursday the Council of the Society were conveyed to the scene of operations by special train on the Taff-Vale line, running through a charmingly picturesque country, though its rusticity and solitude are marred and broken by blast furnaces, coke ovens, tin works, and the high-reaching chimney-stacks which ventilate the collieries. The district is one of the most populous in South Wales. The morning was exceedingly favourable for visiting the district, but as the day wore on the heat became almost unbearable. The sewage lands, belonging to the Local Board of Health of Merthyr Tydfil, have been one of the most successful speculations undertaken in the country for the utilization of sewage. The Board was driven to find out some means for the disposal of the town sewage, the population being not less than 52,000. The Board was having constant fights with other local authorities for polluting the already polluted river Taff. Ultimately the Board was placed in Chancery, and the town was then put under the professional care of Mr Bailey Denton, who, after due consideration, recommended that the sewage should be filtered and irrigated. The sewage was filtered through a series of filters, and the effluent was then distributed through a series of pipes to the various plots. The sewage was distributed evenly, after

being properly strained. The water in the land thus divided has been nearly 7 feet deep, and in such a way that no sewage can descend directly to the surface. Mr Bailey Denton obtained, on the 10th of March last, authority from the Local Board to the surface of the filtering areas for the purpose of crops, and to plant such vegetable crops as were suitable under the circumstances. Accordingly, on the 14th following, the land being ridged up for the purpose, the planting of cabbages and mangolds commenced. On the 1st of August, seventy-seven days after the commencement of planting, part of the land was offered for sale by auction, and realized £17, 15s. an acre, while some portions drawn from the sale realized afterwards £22, 13s. 4d. an acre. During this period of seven days, the sewage of the district was filtered on to the filtering areas, thus affording conclusive proof of the capability of producing vegetables during the filtration of the sewage. Since the crops were raised and sold have been cleared from the ground and sold, fresh ones have taken place, and were to-day inspected. Portions of this year's crops have already sold at £22, 13s. 4d., £27, and £13s. 4d. an acre respectively, yielding an average of £27, 9s. per acre.

Mr Bailey Denton was present, and delivered an address, in which he described the modes of dealing with sewage, and illustrated upon the Merthyr sewage farm, one being intermittent downward filtration, which the most is made of the sewage; and the other wide irrigation, which the most is made of the sewage to fertilize many acres of land. Sir William Wynn, M.P., as the President of the Royal Agricultural Society, proposed a vote of thanks to Mr Denton for his

LEGISLATION AND THE HIGH PRICE OF MEAT.

THE following interesting communication on the above subject appears in last number of the *Journal of the Society*, from the pen of Mr T. Briggs:—An opinion is now springing up in the centres of the country, especially in Lancashire and Birmingham, on the question of the price of butchers' meat. This is what every one who has expected who "looks an inch below his nose" (to make use of a vulgar

Now, of all social problems this is perhaps not the one—of the most vital; what can a working man do in the vitiated air of the manufacturing districts if he cannot get animal food?

I know by painful experience that he cannot do a fair day's work and enjoy life if he can have at least $\frac{3}{4}$ lb. a day of beef or mutton. This, as a rule, must be assumed in arguing the question; of course there are exceptions. In order to solve this problem, it is highly necessary that we should appreciate the true cause, not the direct and immediate visible cause, but so all those collateral and indirect causes which lie at the root of the cause, which are seldom recognized even by the best of our statesmen. My experience is that when I lived in a rural district, and in the country labour could breathe the pure air, unaltered by the smoke and chemicals from tall chimneys, I could do a fair day's work and enjoy life on a $\frac{1}{4}$ lb. per day of animal food (judiciously prepared); but when I returned to the manufacturing districts I found that a pound was nearer the mark for sustaining life and health. I will not enter into the causes which every one sees, or thinks of, viz., that the butchers are the culprits or that the farmers are extortioners. I generate both. I now proceed to shew the real cause of butchers' meat being so near the present prices, and I shall have to assert as a consequence of the mode of levying taxes on the transfer of commodities from place to place, the land-

holders of this country alone are burdened with the weight of £244,800,000 odd annually; whereas, if the taxes were levied direct, £74,500,000 would suffice, and this would enable the government to emancipate the people from the burdens which the present fiscal system subjects them to. The budget that I recommend is one by the author of "The People's Blue-book," as follows:—

| | |
|--|-------------|
| 1. Property tax (10 per cent.)..... | £36,061,525 |
| 2. Personal or householders' tax, from £1 to £10 per house according to value... | 34,500,000 |
| 5. Crown lands | 447,723 |
| 6. Miscellaneous | 3,205,253 |

Cost of collecting about one million ...£74,214,501

Nos. 3 and 4 are the post and telegraph profits, but the author does not consider these legitimate sources of revenue; these profits he would appropriate to the general good, by lowering still further the price of friendly and commercial intercourse of the people (and would also take the railway system, and use it for the same purpose). But to return to the point (the cause) of higher prices; it is the same thing that causes these high prices in everything else as well as butchers' meat. Well, butchers' meat is the produce of the land; ten millions of acres are thrown out of the cultivation in Ireland alone through the operation of the tax upon malt. This crop is not much cultivated in Ireland in consequence of the prohibitory excise duty, which makes the Irish agriculturist pay to the State £70 out of every £100 worth of barley he malts. The result is that, instead of the most economic and scientific mode of agriculture, viz., the four-course shift, in which barley would take its legitimate place (Ireland being the best barley country in the world as to soil and climate) the agricultural operations are thrown into chaos, and the best land into grass, which does not produce anything in the winter season for sustaining the quantity and quality

of the stock required to feed thirty millions of people. Under the present circumstances, malt is too dear for keeping up the flesh of the animals during the winter season, because we have not only the duty of 70 per cent. to add, but also the advanced price through the non-production of about ten and a-half millions of acres. What does this loss amount to? Now, the estimate of loss was made in 1868, and evidence given by some of the best landholders and farmers in the kingdom before the committee of both Houses that "if the malt duty were abolished butchers' meat could be produced at 2d. per lb. lower price for the whole of Great Britain." Well, now, let us take the official figures as to the consumption of the United Kingdom. Say, in round numbers, the consumption of stock is eighty millions sterling per annum, and 2d. per lb. is about 25 per cent. on this eighty millions, that is a loss to the country of twenty millions, which does not benefit any class or individual in any way. The farmer does not benefit, because he can only breed, and rear, and feed so limited a quantity that he is obliged to ask £12 for what he would otherwise have to sell in duplicate at £6, say in young stock. The butcher does not benefit, because a bullock that he could once buy at £12 is now selling at £24, and so on. Now let us see how the farmer and the working classes are

affected in the consumption of their bread. This same malt duty, in order to put a seven millions into the Treasury, in fact all classes are robbed—by consent, per se, as a rule. Taking the thirty odd millions of population in the aggregate, there are six millions of adults, or persons over eighteen years of age, and allow only one pint of malt to each adult—say half-a-pint to dinner and half-a-pint to supper (this, I will surmise, Bremner himself would allow). This is one pint per day at 2d., in place of a 1d., for the whole country of £27,000,000 sterling per annum, and this is not much to the benefit of any individual or class. It may make a few Besses or Allsops, but that is all. My experience as a common brewer enables me to assert that I agree with the author of the "People's Blue-book," when he says, "one pint of good wholesome table-beer could be produced (when the malt duty is only one-halfpenny, and leave 100 per cent. profit to the brewer, this at the strength of four bushels of beer to the quarter of malt." Well, if a brewer could get 100 per cent. profit on one-halfpenny a pint, the retailer could sell for one penny and get the same profit, barring the cost of the bottle. Now, if the people would only get the agitation for the total abolition of the tax, which I have put before them as a demonstration of how the £244,800,000 per annum goes, they would soon have meat cheap

THE PRICE OF MEAT AND RESTRICTIONS ON THE CATTLE TRADE.

MR JOHN P. BYRNE, Ballybohill House, Co. Dublin, expresses his views on this important subject as follows:—
 "The cattle trade in England and Ireland has of late years been enormous, and has been entirely upon the basis of a fatal disease have been imported from foreign animals. These diseases, no doubt, have paralyzed the efforts of the producers to increase their supply, and

deprive the consumers, not only of the advantages of an increasing supply, but of the quantity these losses take from the production, which Mr Baldwin estimates at 2,000,000 annually in Ireland, caused by contagious and preventable diseases. Ought such a question of such magnitude demand the most serious attention of all classes? There have been made to promote and encourage the importation of foreign animals to supply the deficiency.

nts of England. It is true their operation well-nigh been fatal to the best interests of the country. The destruction of stock in England during the cattle plague cannot be repaired by years' importation of fresh stock. Had Ireland fallen a victim to this calamity, she would have been the prostrate country in the world; but laws have been made and cannot or cannot be changed: they form but a link in the great chain of Free Trade policy, promulgated in the sense of justice, accepted in the spirit of reciprocity, extending commerce and increases the wealth of the nation. Yet the loss of 2,000,000 cattle in Ireland demands not the less consideration. The Government has made great efforts to stay the spread of disease and has wisely put on restrictions, to prevent abuses. I am not one of those persons looking from a narrow, interested view at this question, would seek to sweep away all restrictions. I am of opinion that most of these restrictions are wisely and prudently made. The slaughter of foreign animals on arrival was a great measure to save the health of this country; while it gives the consumer the benefit of the supply. The check on exhibiting of diseased cattle in fairs and markets, and a reasonable control over persons being travelled on highways, promote public health, and carry with them a conviction of public justice as well as their necessity. The requirement of giving notice to the authorities of the existence of disease in any flock or herd is right, and ought to be enforced. It is not my intention here to rescind such Orders of Council as I may think harsh, or such as I may deem oppressive. My object is to shew the total defect in the system which makes laws, in view of the public good, regardless of individual losses, rendering penal any infringement of the laws, while the origin of that infringement does not rest upon the party charged. The offence is consequent upon the act over which the offender has no control, yet no means of escape is even hinted at by any of those Council Orders. If the owner detects the appearance of disease

VOL. III.

in one of his largest herds, what is he to do? The animal at this stage may be worth £20 or £30. The owner is bound to give notice to the authorities, and is soon informed that he cannot remove or isolate that animal, lest the disease should be spread during its removal along a road, or to any place; and each removal will cost him a fine of £20. It naturally suggests itself to him, if the removal of the animal infects the air, and spreads disease to cattle in remote places, what must be the consequence in the herd with which this animal is in contact, and is not destruction inevitable? Yet not one of these Council Orders suggests a remedy; but assuming such a relaxation of these Orders as would enable the owner to remove a diseased animal for the purpose of isolation, this animal, in the early stage of attack, may be of the best human food, but no power rests with the owner to dispose of it. He may try treatment, unskilled treatment, which is usually fatal, and the animal after some days' trouble, cost, and inconvenience, yields to the disease, and is rendered wholly useless. Thus the losses referred to by Mr Baldwin are incurred. Men are paralyzed in the free action of the trade—high prices for meat exist; yet the effects of these high prices are not felt, as they should, by stock-owners. Beef at this moment is £1 per cwt. above the average price of some years past. Yet the whole of that increase has been given to the increased price of lean animals. The effort of stock-owners to produce an increased supply of meat is not wanting, as is apparent from the fact that the entire increase in the price of beef is given in the case of calves, £3 to £4 being now given, while 10s. to 15s. was formerly the price. There is one effort more to increase the supply of stock in this country, and I believe it is capable of great expansion, and that is the production of calves, which involves another and distinct branch of the cattle trade, which is known as the dairy business. One may naturally ask, with £3 or £4 for a calf to begin with, and 1s. 4d. to 1s. 8d. per lb. for butter, why this mode of occupation is not immensely extended? The true answer is, that dairy

. M

cows are, and have always been, most subject to pleuro-pneumonia, and when attacked are of least value, the restrictions offering no safety, but enacting penalties, in addition to the losses, paralyzing every effort and endangering every attempt at the occupation, however profitable. Thus not only does the existing state of the laws regulating the cattle trade lead to the loss of 2,000,000 annually of the actual production, but to the check of an increasing supply, which would amount to a still greater value. A recent Order in Council has appeared which aims at a most important object, the prevention of the increase of scab in sheep; but it is like most of the Council Orders on these subjects—wanting in all the elements which could render it operative. Like its predecessors, its infringement is penal in the sum of £20. I will quote the chief passages:—"No sheep affected with scab shall be removed unless at least five days before such removal a remedy shall have been applied." I would ask what constitutes this remedy, or what is a remedy? The party accused may call anything a remedy, and is he to be convicted because he did not use some particular remedy of which he was wholly ignorant? I need hardly say the Order may contain useful advice, and may be a useful check, but its penal part will be found wholly inoperative. I have long felt the magnitude of the subject and its importance to the country, and, in a deep anxiety to arrive at the best solution of this manifest difficulty, I have come to the conclusion that there must be such restrictions as will aim at the prevention of the spread of contagious and infectious disease amongst cattle, but that those restrictions must be carried out under a well-regulated and duly-qualified authority, to give effect to the administration of such laws as may be

necessary, and at the same time possessing full professional knowledge and skill, with a proper judgment of disease to enable a definition of what is and what is not fit for human food, and having a capability of treating disease in all animals, with a view to recovery. Such an institution would, in my opinion, give great confidence to stock-owners, and not only save losses, but largely promote the increase of production—the only means by which the price of meat can be lessened, and, whilst lessening the price to consumers, would still afford to the owners of stock more real profit than is now enjoyed, consequent upon the losses sustained. I believe the only means by which this object can be effectively carried out would be the creating of an institution in some degree resembling the medical charities, and the appointment to districts or poor-law unions of a requisite number of well-qualified veterinary surgeons, whose duty it would be to see that the Orders in Council to prevent the spread of disease were carried out, to certify on inspection such animals as, though diseased, were not affected to the injury of meat for food, and also to direct such treatment as would tend to the recovery of those not slaughtered. I believe a fixed salary, with a small fixed fee for each attendance, would be the best mode of remuneration, the salaries being chargeable to one general account, and levied with rates. This mode of action, with a central *depôt* or dispensary where the best medicines and appliances could be had at first cost, would be of great value. I have not the least doubt that it could be carried into full operation at a cost of less than one penny in the pound, while in unions like Dublin, with large valuations and small area, less than half the sum would be sufficient.

WARRIORS IN THE HARVEST FIELD.

IN the present dearth of agricultural labour, a correspondent of the *Times* makes a suggestion with reference to the cutting and harvesting of the crops, which, he says, was acted upon successfully some years ago. At that time, he recommended that the War Office should permit as many of its *employees* as could be conveniently spared from their duties, to go away for three weeks to the assistance of the farmers, and the War Office did so, greatly to the advantage of corn growers, and money was put into the pockets of the soldiers.

The correspondent goes on to say, what is very true, that "corn crops, when fully ripe, will stand a very few days uncut without sustaining some damage, unless the weather be still, dry, and dull, which very seldom happens to be the case. A high wind, a scorching sun, and, I need scarcely say, rain, mist, and dew have all a tendency to reduce the quantity or deteriorate the quality of the grain." He thinks that dockyard labourers, as well as soldiers, might be relieved from their duties to "reap and be a farmer's boy" for three weeks, commencing from the 15th August next. Why this date is fixed upon specially we do not know, seeing that some crops are ripe now; but it looks like sarcasm, after the enforced exodus of dockyard labourers for the last year or two, that a suggestion should be made that there are still plenty to spare for work in the fields.

But granting that this is so, we are afraid the improvements which have taken place in agricultural operations since the year of which the *Times'* correspondent writes, when the men of war (for the nonce) "beat their swords into ploughshares and their spears into pruning hooks," would render soldiers and dockyard labourers rather cumberers of the ground, than aids in getting it cleared of the golden grain.

Before the introduction of the reaping

machine, the services of any one who could haggie away with a sickle were acceptable; now they are next to worthless, and the notion that such men as soldiers and dockyard labourers, or any other able-bodied men, could earn, as the correspondent says, from 7s. to 12s. a-day in the harvest fields is simply preposterous. Straw is of more value now than it was wont to be. Farmers feed more stock, and they cannot afford to lose an inch of straw. They demand it to be closely shaven to the ground, except in cases where the stubble forms a protection to young grasses, and they also want it evenly cut throughout the entire field. The machines in the market, now at a comparatively low price, can fulfil these requirements; not so sickle-wielders of the kind "H. G. S." recommends. They too often leave nearly half the straw on the ground, and as irregularly shorn as a Vandyked petticoat, and by no means so charming to look upon.

What is wanted now in the field is careful gatherers of the sheaves laid down by the reaping machine, either self-acting or manual—people who will note that the ears are all regularly laid in one direction, and not mixed up with the lower end of the stalks promiscuously, skilful bandsmen, and stookers who know how to set up the sheaves tastefully, at the same time that they place them in a manner to resist the rain in the most effectual way, while allowing the drying airs of heaven to play freely through them.

Soldiers or dockyard labourers might indeed fork up the corn when in fit condition on to the harvest cart, and from that on to the stacker, but they could not stack. It is only a trained man who can deftly catch each sheaf and so dispose of it, keeping the grain from the destructive or deteriorating influence of the atmosphere, as to produce a cereal building so graceful

in form as to be a beauty rather than a blemish in the landscape.

Harvest work could be no more accomplished by soldiers under present conditions, and at the price "H. G. S." assumes they would get, than "Hodge" could rush from the plough into the battle-field, a man skilled in all the art of war. Their presence among the beans and the barley would be as little pleasing and profitable to farmers, as agricultural labourers with scythes over their

shoulders would be to the commanding officer when they were called into action.

We are afraid, therefore, that if we have to depend for the safe ingathering of the harvest upon the classes whom the *Times'* correspondent names, we shall be left in a sorry plight indeed, even were the War Office and the Admiralty to give their sanction (which is unlikely), to a furlough, *en masse*, for such a length of time and for such a purpose.

Agricultural Implements and Machines.

AN IMPROVED BAG-HOLDER.

THE accompanying engravings illustrate an excellent arrangement for holding bags while undergoing the process of filling, which, we think, will help materially to economize time and labour. Farmers are

Besides, the process, as a general rule, is slow and unprofitable to the farmer, and it would be to his interest to adopt something which will at once economize time and labour. The following, we imagine, would meet a want long felt :—

A proper size for the one delineated in fig. 2 is the platform *K*, 24 inches long, 14 broad, and 2 in thickness, either pine or oak ; standard *B*, 36 inches in height ; hopper *P*, 16 by 16 inches at the top, bevelled to admit of the hooking thereon of the bag *O*, as shewn. It is obvious that by having the upper portion of the hopper of larger dimensions than the top or mouth of bag, the operation of filling can be performed much quicker, and with less liability to spill the grain. This bag holder also dispenses with one hand.

Fig. 1 illustrates a simple arrangement for the purpose. The hopper is of the size of that in fig. 1. It is supported by three short straps or chains *R*, *R*, *R*, attached to as many of its several sides, which in turn are attached at the point *M*. This bag-holder is cheap, simple, portable, and durable. It can be attached to the granary wall or any portion of the barn above the floor. By providing the main chain *M* with a hook, it can be raised or lowered to accommodate bags of various lengths.

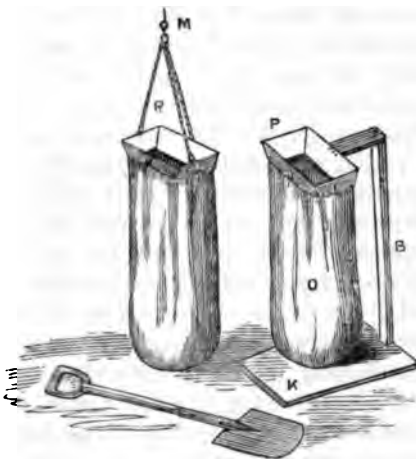


Fig. 1. Fig. 2.
Improved Bag Holder.

well aware of the trouble and labour involved in this simple operation ; how two, and frequently three hands, are seen engaged in replenishing a single bag of corn, where one might suffice without much additional labour.

ade deserves greater encouragement
e public generally than it has yet re-

supply of pork from abroad has fallen
sum paid up to the end of July
349,418, whereas in the same period
year we expended £567,710. The
tion of poultry and game is steadily
increase. In the month of July we
ebited with £6777 under these two
-commodities which we ought to ex-
ather than import. In the seven
we paid £82,105, while last year we
ve £65,869.

January, we have imported 3,199,439
hundreds" of eggs, reaching a total
£1,247,659. Last year that amount
t quite so large, the figures being
37 "great hundreds," valued at
257. Butter and cheese are slightly
quantity, but considerably higher in
The amount of butter and cheese re-
during the seven months this year was
97 cwt., and in the corresponding
of last year, 1,233,650 cwt. Alto-
we have been indebted to foreign
of supply for dead meat and dairy
e to the amount of £10,497,890
the last seven months.

in the month and seven months we
ad larger importations of corn than last
Barley came to hand in much greater
ies during last month, as compared
e same month of last year; and in the
months the bulk was nearly twice as

Oats shew a falling off in the month,
the longer period the importation is
. Peas reached us in greater quantities
month, but in the seven months the
s are but slightly above those of last
Beans were lighter during the month,
is the case with oats, the figures set
the seven months of the year are

Indian corn, or maize, shews an
station during the month and longer
Both during July and the seven
s, wheat meal and flour are lighter
ations as compared with last year. The
t of money disbursed for corn during
t seven months is over £3,000,000

sterling in excess of the sum expended during
the same period last year, the exact figures
being £24,127,978, as against £21,112,499.

The following tables give the quan-
tities of the several kinds of cereals, &c.,
the names of the countries from whence they
were derived, and the values for the past
seven months, as compared with the corre-
sponding period of 1871:—

QUANTITIES.

| | Seven Months ended July 31, 1871. | Seven Months ended July 31, 1872. |
|--|---|---|
| Wheat. | Cwt. | Cwt. |
| Russia..... | 7,486,482 | 9,650,270 |
| Denmark | 33,433 | 112,994 |
| Germany | 1,673,461 | 1,998,577 |
| France | 38,792 | 229,747 |
| Austrian Territories ... | 215,108 | 30,262 |
| Turkey, Wallachia, } and Moldavia | 927,072 | 647,005 |
| Egypt..... | 140,940 | 1,413,579 |
| United States | 7,063,994 | 3,706,241 |
| Chili | 288,001 | 882,022 |
| British North America | 1,166,348 | 310,849 |
| Other Countries | 353,047 | 652,553 |
| Total..... | 19,386,678 | 19,634,099 |

VALUE.

| | | |
|--|-------------|-------------|
| Russia..... | £4,261,349 | £5,599,960 |
| Denmark | 20,531 | 74,178 |
| Germany | 1,099,789 | 1,327,194 |
| France | 21,494 | 142,702 |
| Austrian Territories ... | 135,842 | 17,754 |
| Turkey, Wallachia, } and Moldavia | 478,532 | 344,554 |
| Egypt..... | 78,152 | 707,247 |
| United States | 5,231,894 | 2,392,528 |
| Chili | 184,660 | 577,205 |
| British North America | 671,599 | 200,160 |
| Other Countries | 219,843 | 428,278 |
| Total | £11,403,685 | £11,810,760 |

QUANTITIES.

| | Seven Months ended July 31, 1871. | Seven Months ended July 31, 1872. |
|--------------------------------|---|---|
| | Cwt. | Cwt. |
| Barley..... | 3,935,290 | 7,785,191 |
| Oats | 5,484,669 | 7,007,691 |
| Peas | 565,535 | 577,598 |
| Beans | 1,368,066 | 1,822,658 |
| Indian corn or } Maize..... | 7,625,487 | 11,500,190 |

| | VALUE. | |
|------------------------------|------------|------------|
| Barley..... | £1,576,339 | £2,999,467 |
| Oats | 2,158,631 | 2,545,011 |
| Peas | 249,255 | 246,814 |
| Beans | 614,798 | 727,658 |
| Indian corn or Maize..... | 2,983,019 | 4,164,507 |

| | QUANTITIES. | |
|-----------------------|---|---|
| | Seven Months ended July 31, 1871. | Seven Months ended July 31, 1872. |
| Wheat Meal and Flour. | Cwt. | Cwt. |
| Germany | 543,507 | 555,151 |
| France | 2,254 | 287,620 |
| United States | 1,287,184 | 253,043 |
| British North America | 151,995 | 112,672 |
| Other Countries | 471,338 | 552,972 |
| Total | 2,456,278 | 1,761,458 |

| | VALUE. | |
|-----------------------|------------|------------|
| Germany | £506,283 | £511,560 |
| France | 1,674 | 269,111 |
| United States | 1,044,393 | 198,127 |
| British North America | 111,905 | 97,079 |
| Other Countries | 455,839 | 552,679 |
| Total | £2,120,094 | £1,628,556 |

Coming to manurial substances, we note a falling off in the imports of guano, both during the month and seven months. In July this year, our receipts of that fertilizer amounted to 7660 tons, to compare with 10,788 in the same month of last year; and from January up to the 31st of July the total importation was 66,203 tons, which is a falling off of 76,176 tons. The sum we paid during the longer period was £643,592, while the amount last year was £1,637,451. Bones have been received in larger quantities in the month and seven months. The amount expended since the beginning of

the year, has been £1,160,625, as against £1,127,420 in the same term last year. Rape seed has fallen off in both periods.

From all the countries enumerated below, and especially from Australia, the importation of wool last month fell far short of the amount received last year. On the seven months this diminution is not so palpable, however, as will be seen from the following tables, which shew the countries from whence they come, and the quantities and the values since the opening of the year:—

Our supplies of potatoes from abroad have perceptibly increased during the month, and in the seven months we have imported more than double the quantity we did in the same period last year. Last month we expended £98,410 for these esculents as compared with £38,190 in July 1871; for the seven months this year, the amount is £353,005, while in like term of last year it only reached £119,711.

Oil-seed cake has decreased; clover and grass seed have likewise fallen off to a considerable extent, both in the shorter and longer period; and a material diminution is noticeable in the case of cotton-seed on the month, but a counter-balancing increase on the seven months. The price paid for the latter commodity up to the 31st of July, was £1,160,625 as against £1,127,420 in the same term last year. Rape seed has fallen off in both periods.

From all the countries enumerated below, and especially from Australia, the importation of wool last month fell far short of the amount received last year. On the seven months this diminution is not so palpable, however, as will be seen from the following tables, which shew the countries from whence they come, and the quantities and the values since the opening of the year:—

| | QUANTITIES. | |
|--------------------------|---|---|
| | Seven Months ended July 31, 1871. | Seven Months ended July 31, 1872. |
| Wool, Sheep, and Lambs. | lb. | lb. |
| From Countries in Europe | 18,747,931 | 19,840,885 |
| „ British Possessions | | |
| in South Africa ... | 19,590,215 | 18,147,575 |
| „ British India | 13,677,526 | 13,924,286 |
| „ Australia..... | 159,849,104 | 153,582,710 |
| „ Other Countries..... | 18,251,904 | 23,711,312 |
| Total | 230,116,680 | 229,206,768 |

| | VALUE. | |
|------------------------|-------------|-------------|
| Countries in Europe | £986,636 | £1,152,848 |
| „ British Possessions | | |
| in South Africa ... | 1,004,411 | 1,150,244 |
| „ British India | 471,039 | 615,577 |
| „ Australia | 9,321,166 | 9,543,493 |
| „ Other Countries..... | 659,059 | 1,106,347 |
| Total | £12,442,311 | £13,568,509 |

Turning to the other side of the account, we note a slight reduction of the export of butter and cheese on the month and seven months. For these two commodities we received £211,471 from the foreigners during the present year, and last year the sum amounted to £314,007.

To France we exported 112 horses during July—400 less than in the corresponding month last year; to “other countries,” the figures set down against last month were only 85, but even these shew an increase on the number sent from our shores in July last year. The total number sent during the past seven months was 1888 as against 4988 in the same period last year. The value this year was £104,913, whereas last year the sum was £178,711. The prices obtained by breeders this year seem to have far exceeded those of last. £55 is the average of the past seven months, and the average of the corresponding period of last year was only £35.

The following tables shew the exports and values of wool, and the places to whence they were consigned:—

| QUANTITIES. | | |
|-------------------------|-----------------------------------|-----------------------------------|
| | Seven Months ended July 31, 1871. | Seven Months ended July 31, 1872. |
| Wool, Sheep, and Lambs. | lb. | lb. |
| To Germany | 1,557,900 | 1,036,262 |
| „ Belgium | 2,075,373 | 834,719 |
| „ France | 1,466,613 | 495,076 |
| „ United States | 656,536 | 1,521,001 |
| „ Other Countries ... | 988,696 | 683,874 |
| Total | 6,745,118 | 4,570,932 |

| VALUE. | | |
|-----------------------|---------|---------|
| | £ | £ |
| To Germany | 110,706 | 88,169 |
| „ Belgium | 127,948 | 72,763 |
| „ France | 121,607 | 41,696 |
| „ United States | 35,629 | 111,092 |
| „ Other Countries ... | 75,361 | 64,433 |
| Total | 471,251 | 378,153 |

MODERN FARMING AND THE BREEDING OF STOCK.

THE following sensible remarks on the meat question are made by a “Bedfordshire Farmer,” in the *Daily News* of Thursday:—Your correspondent, “A Middle-class Householder,” August 5, referring to this subject, says: “Until the necessity for the present high price of meat is made much clearer than it is, the masses will be certain to complain.” I am sorry to say I think I can make that necessity too clear. Perhaps many of your readers are not aware that agriculture, like other pursuits, has, within the past twenty or thirty years, gradually assumed distinctive characteristics in different localities. Twenty or thirty years ago it was quite exceptional that a farmer did not keep a breeding flock, and wean some calves. In many of the best farmed districts of England for years past it has been almost exceptional where they have done so. The reasons are plain. Some

parts of England are much better adapted for breeding than others. In many of the best turnip-growing and mutton-producing districts, the rule has been for farmers to buy the sheep which are bred in Sussex, Wilts, Berks, and the western counties, which, owing to their greater area of grass and open downs, are better adapted for it. These sheep are at once put on to artificial food, as oil-cake, corn, &c., to make them fat in the shortest possible time. This plan has generally paid, and has also produced an abundant crop of corn. The supply of sheep from the above named counties up to the year 1868 kept pretty equal to the demand, and the price of mutton was not too high. At that time we could purchase good lambs for winter feeding at from 35s. to 45s. each; now they cannot be bought under 55s. to 65s. Shearling sheep were bought freely at from 45s. to 52s.;

now it is difficult to buy them at all, and they cost from 60s. to 70s. per head, as poor as may be, or about 1s. 2d. to 1s. 4d. per lb. In numberless instances they are worth no more when fat than they cost when very lean; and the consequence is that many thousands of acres of land which should and would have been under turnips if sheep could be purchased advantageously to eat them, are now bare fallow, or sown with a green crop, to plough in as a manure, and thousands of acres of growing clover are also unconsumed for the same reason. This state of things does not afford much prospect of an early reduction in the present high price of meat.

The drought of the years 1868-1870 compelled the large breeders of sheep to lessen, and in many cases entirely to dispose of their flocks, which were sold to be fattened the following year, or killed as they were. The effect of these seasons to reduce the numbers of stock in a country, coming so near to the cattle plague also—was much greater than is generally supposed. I may, however, assure your readers that the evil, in time, will cure itself; for breeding is now more profitable than feeding—and is, therefore, largely on the increase. The notable

change in the habits of the agricultural community is another cause which conduces to increase the price of mutton and beef. I very well remember the time when pork was always quoted at a higher price per stone than the former, and was almost the only meat eaten by working men; now they eat it very daintily, if at all, although it is generally from 1s. to 2s. per stone lower in price. The annually increasing consumption of veal and lamb, as you have remarked, conduces toward the same result; but for this the public has itself to blame—certainly not the butchers. They are often obliged to pay 10d. per lb. for a living sheep—and not unfrequently more—where, then, is the use of blaming them, as many do? I take it that, however hard the very high price of meat may be upon the working community and the “Middle-class Householder,” it is quite useless to complain. The causes are natural, and the consequence must be borne. There appears to me more reason to complain about the increasing price of coal—for that is advanced by a labour strike—while meat is advanced by a strike of the seasons. If rinderpest is again allowed to enter our herds, we shall have to be vegetarians all.

BREEDING AND REARING SUSSEX STOCK.

AT a recent meeting of the Tunbridge Wells Farmers' Club, Mr G. N. Roper, of Frant, read a paper on “Sussex Cattle,” from which we make the following extracts:—

It was both sad and surprising to assume that we breeders of the Sussex stock in a district so fertile and so well adapted to its soil, and this was the case in the neighbourhood of Frant. Although the Sussex stock has been bred for stock farming, and has been so for many years, the fact of the railways putting them into communication with the great towns and metropolis, he must, in consideration of the subject, take them back in thought to at

least fifteen years, when Sussex stock was alone prominent with breeders, and justly so, as they grew and thrived on their native land, and on what he might not inaptly call the hard treatment then customary, as no other breed could. Their size, too, fitted them for work, and the ox teams on many farms were very useful, especially in clearing the woodlands, while they were kept very cheaply on poor pastures during the grazing season. At that time many herds of Sussex stock were found in this neighbourhood, and these, with care and judgment, reached great excellence, and had since contributed to the high posi-

tion the breed had attained at the Smithfield Club Shows. The cows were not as a rule good milkers, but that was a secondary consideration compared with the production of meat; and the effect which resulted from paying attention to their quality, combined with their aptitude to fatten, was the production of steers which a little over two years old were worth from £20 and £25 a-head—a speedy and profitable return all would admit. Scarcely any roots were then grown, and the calves had a little bran and ground oats with chaff, a short time before and after weaning, and were wintered generally on the pastures with some hay daily. Yearlings fared much the same the first winter, but older beasts were yarded on hay and straw as thrashed from the barns once a-day, without any artificial food till they were stalled for fattening. He recollected the progeny of some highly-bred short-horns being treated thus with Sussex stock, and they degenerated so much that the trial was abandoned. Compared with the present treatment of stock, it seemed to him that little was done until lately to help Nature, and he ventured to suggest whether the increased cost of feeding resulted in a better return than under the old *régime*, taking all things into consideration. His practical knowledge of the subject of breeding stock as applied to a distinct and pure breed of stock ceased nearly fifteen years ago, when he sold the herd of Sussex stock on the Bayham Home Farm. This herd was his only for a year, but he had for several years previously been a witness of its rise and progress under his father's care.

As he had before remarked, the introduction of the railway caused farmers to turn their attention to dairy farming and the supply of milk to the metropolis. This resulted in a cross breed being substituted for the Sussex on the majority of farms. He was not aware that hitherto much attention had been paid to the breed other than to the size and milking properties of the cows, and he could not help thinking, therefore, that landowners and large dairy farmers would do well, and would render great assistance to breeders, by importing into the district some pure-bred bulls, by which means the progeny when reared on

their own farms might possess quality and growth enough to become profitable stock.

He would throw out one or two suggestions, and would remark that having determined upon the breed best fitted for their purposes, it would be well to select one or two cows possessing the approved qualities of the herds, and in order that a family likeness might be secured, which was a great feature in the rearing of stock, it should be formed gradually by selecting heifers from good dairies, and correcting faults and deficiencies by the judicious selection of bulls. Having thus disposed of the breeding, he would next refer to the feeding of cattle. His own practice was to give oil-cake in small quantities while at grass towards the end of the summer, which was increased generally with the improved state of the animal. He gave roots with chaff in addition once a-day when in the yard, with ground corn or pea meal and a little hay likewise, as he was of opinion that the hay assisted Nature in cud-ding, and, therefore, helped forward the fattening process. Whilst fully appreciating the great value of roots (such as swedes) in the fattening of cattle, he was almost induced to give up the cultivation of them, because he found it was antagonistic to the cultivation of hops, which was of great importance to farmers in this neighbourhood. The root crops and the hops required attention generally at the same time, and there was such an inclination on the part of labourers to work in the hop-garden that it was impossible, except at ruinous outlay, to get them to work in the root fields.

It had, too, become not uncommon for covered buildings to be furnished for the accommodation of neat stock. He, however, somewhat questioned their utility, except in the finishing off of stock for the butcher. Young stock should be treated more naturally, to secure hardihood and to resist disease. Once shut up they should remain so to the end, as an unexpected change of weather might, when they were turned out on the pastures, lay the seeds of disease fatal to their well-doing. As regarded sheep, he had a few lambs of the Bayham flock until last year,

with other causes, to raise the price of our animal food. The practice reduced to plain figures may be stated as follows:—Pure cake at £12 per ton is sufficiently nutritive that 1 to 3 lb. per diem is ample for ordinary bullocks; but of the common variety, thoroughly adulterated up to the middle-man's standard, 8 or even 10 or 12 lb. will be required. If we, therefore, pay £6 per ton for common cake, and give the extra quantity, we then certainly pay not less than £18 for what can be better and even more safely effected for £12, as it must be remembered that adulteration not unfrequently means *poison*, as recent events in some of our valuable herds have fully proved.

Among the brands of genuine linseed cake with which we are acquainted, that C.S., manufactured by Messrs C. Simons & Son, Boston, Lincolnshire, is worth notice. Being on a visit to the quaint old shipping town, we availed ourselves of a privileged inspection of the works of that firm during the past week, and here we saw sufficient to confirm our ideas of the justice of our remarks on the importance of good cake. Messrs Simons have recently erected new and complete premises, which are intended to meet the requirements of their extensive trade, secured entirely by turning out only good and serviceable oil-cake.

Our readers will be interested in the following items. A large brick building having walls 2 feet 3 inches thick, is raised to the height of four stories, three of which are devoted to the storage of whole seed and oil. The area covered by this building will be better estimated when we shew that nearly 14,000 qr. of seed can be accommodated, with upwards of 400 tons of oil in proper tanks, and 800 tons of manufactured cake.

The machinery consists of four pairs of crushing stones, and twelve mills; there are twenty-four hydraulic presses, besides other necessary adjuncts, and these are set in motion by a magnificent stationary engine of 50-horse, nominal, all of which are in excellent order and efficiency, and the result of a

liberal expenditure of some thousands of pounds.

The unloading of vessels in the river is accomplished in a most complete and peculiar mode. As the mill stands some distance from the river bank, and separated from it by a public highway, a covered gangway has been thrown across from the top storey, the other end being in communication with a large tall iron tower on the bank. Foreign vessels with cargoes of seed are brought to anchor in Boston Deep, and there discharged into sloops, which are brought up the river and moored at the foot of the iron tower. A "Jacob's Ladder," or a wide leathern belt, having metallic cups on it throughout its entire length, and running in a square tube, is lowered into the hold, and motion communicated to it by means of a shaft from the mill. In this manner the seed is raised in the tower, and by a succession of endless belts conveyed along the gangway to the interior of the mill—certainly more than 100 yards—without the aid of a single person, and at the rate of 100 qr. per hour.

Of the value and efficiency of such means in the manufacture of oil-cake we cannot say too much. It is one of the means whereby firms may acquire credit and renown, for only by the steady and continued offering of good articles can a sound and perfect trade be secured. Let our agricultural friends investigate these matters more for themselves, and we are certain they will unite with us in the conclusion that a good article is worth a good price, and an inferior article at any price is neither cheap nor profitable for making good beef and mutton.

In other articles than in oil-cake the same principle applies. By far too little advantage is taken of the skill of the chemist by farmers. For the sake of what they consider a saving of a few shillings in manurial substances, in seeds, &c., they often lose untold pounds.

As a commentary on the foregoing the reader is referred to the first article in the present number.

STEAM CULTIVATION ON FISKEN'S SYSTEM.

WE give prominence to the following interesting communication from Mr Simeon Leather, Delmamere Lodge, Cheshire :—

The general attention which Mr Fiskens' double windlass patent steam ploughing tackle excited during the Wolverhampton show last year, and the increasing interest with which all practical particulars regarding it are now received, must be my apology for requesting you to insert the following. For the information of such of your readers who may not have been previously informed, Mr John Cattle of Marsh Farm, Sealand, near Chester, with myself, purchased a set of this tackle, which we have worked since the 11th March, with one of Fowler's 12-horse power traction engines, and from that date up to the present time, we have ploughed 80 acres, and cultivated, in all, 534 acres. The work on my own farm has been as follows, 80 acres of ploughing, which we did in five days and a-half; 44 acres of cultivating, at 14 inches deep, which was done in four days; and 90 acres of cultivating, at a depth of from 12 to 17 inches, in eight and a-half days. The remaining work has been done on my partner's farm, and in the neighbourhood of Chester, and I do not hesitate to say that we have done more work than we could have done by any other system.

As I think I have mentioned before, the tackle is worked by ordinary labourers taken from my farm, who have, without difficulty,

managed every portion of the work, and have now got them sufficiently trained to do down the tackle in something like two hours while the time consumed in getting ready for a removal is only one hour and twenty minutes.

I have tested this tackle upon the most difficult fields, and in the worst of weather, and it has done its work most satisfactorily, and, in comparison with the double engine system, with certainly 20 lb. less steam.

Taking into consideration, therefore, the cost of the double engine system, there is a direct saving of something like £500 in cost, while the saving to the farmer in fuel and cartage of water is also very considerable. As regards the saving in labour power, I may say that I have already enabled to work my farm with fourteen instead of twenty-two horses, which is a number I had formerly to employ.

Mr Thomas R. H. Fiskens, Leeds, to whom we purchased our tackle, now has a heavy set calculated to do the heaviest work, and suited for working on hire, and a light set suitable for a farmer's own use, capable of being driven by an 8-horse portable engine.

In conclusion, after four months' practical experience with this system, I would advise intending purchasers of steam tackle not to depend wholly upon any written reports, but to see the Fiskens system in operation for themselves.

OUR COMMON LANDS.

By Mr J. J. MECHL.

I COME to the conclusion, after thirty years of experience at Tiptree, that our common lands can be cultivated profitably by the investment of capital in drainage (where required), deep and clean cultivation, and ample supplies of manure, natural or artificial. We have 27,000,000 acres still in their primitive state. The Inclosure Commissioners, in their 27th Annual Report, recently issued, say that out of 9,000,000 acres of common and commonable land in England and Wales, of a convertible character, only 670,000 acres in the last twenty-five years have been enclosed. This 9,000,000 acres is exclusive of waste lands in Scotland and Ireland, comprising many additional millions of acres. The question is, therefore, one of considerable magnitude, for the cost of bringing such lands into cultivation, and providing suitable buildings, could scarcely be less than £20 to £25 or more per acre.

About 50 acres of Tiptree Farm are a type of the poorest kind of common land. When fresh ploughed up, it exhibits a map of parti-coloured soils, intersecting each other in a variety of shapes. There you see drabs and yellows, plum colour, black and white; white sand, black sand, gravel, dirty silt, conglomerate pudding stone, bound in rocky masses by black or protoxide of iron, sandy masses bound together by similar protoxides, veins of yellow birdlime-like clay. I have been led to believe that these veins are the remains of a former stratum of clay, which has been broken up by the action of water, and the fragments of which have been carried down by the action of the water, and deposited in the present position. The plant roots and

the plants came to a standstill or miserable existence.

My first operation was to drain the boggy portion 12 feet deep, and the other portions from 4 to 6 feet deep, cutting through the clay veins, and thus making an escape for the pent up water, which now and for thirty years have discharged in the driest summer some 50 gallons of water per minute, and abundant streams in winter. I then, with three strong horses in the first plough, followed in the track with a powerful iron plough drawn by six strong horses, broke up the hard pan, and dislodged masses of pudding-stone and iron-sand.

How my predecessors could get any crops off such land when unimproved I cannot imagine, but I do know, from the workmen's evidence, that the crops were too often wretched failures. On these lands I have since often grown from 5 to 7 qr. of wheat per acre, and 6 to 8 qr. of barley after wheat.

I have now on the field called, and really is, "black-sand," as fine a crop of wheat as could be desired. I never cart any farm-yard or shed manure on this part of the farm, but manure it with the sheep, folded and supplied with cake, corn, malt-culms, and bran, in addition to the ryegrass or turnips; all the straw manure goes to the heavy land; I irrigate the Italian ryegrass; 150 sheep have thus been kept on 6 acres. Well, then, if in any case such results can be profitably obtained, they can on other wastes of similar character, for I have enclosed several pieces. The main cause of my success is (after drainage) very much deeper cultivation than is usually practised. I have perseveringly improved the system for nearly thirty years, and my cultivation is deeper than three-fourths of that done by steam-power, but I have always been careful to keep the top soil

uppermost, and only let it amalgamate gradually with the broken up subsoil.

A Norfolk friend (whose letter was published) found fault with my recommendation to keep the top soil uppermost, and endeavoured to prove I was wrong by bringing his under soil to the top and then turning it back again, so that the top soil was really only buried for a short time and then brought to the surface again. No doubt that was a commendable proceeding on light land, for the subsoil was aerated and broken, and then returned to its original situation.

The late Rev. Mr Smith's plan of exposing the subsoil was an admirable one. He ploughed the top soil together, and fallowed and manured the exposed subsoil. The curse of British agriculture is shallow cultivation—on an average barely the depth of a wine-glass. How often we find a farmer ploughing his upper soil of 5 or 6 inches five or six times, and yet never disturbing his subsoil. The fear of the subsoil arose from want of under-drainage, and even now, according to Mr Bailey Denton, 9 acres out of 10 that require drainage are still undrained.

Drainage is as important to animals as to human beings, and I know that to both non-drainage is the cause of ill-health or disease. I have plenty of practical proof of this.

In fact our country is not half farmed, either by landowner or tenant, and it cannot be until there is a much greater investment of both capital and intelligence on the part of both landlord and tenant, and an encouragement to investment by improved Land-laws and Tenant-right. The latter would not affect certain parts of Wales, for a Welsh M.P., an extensive landowner, said to me the other day, "Tenant-right would make no difference in Wales, for Welsh tenants make no improvements, and therefore could have no claim. The landlord has to do everything in that way."

It must not be supposed that, in finding fault with British agriculture as a whole, I am censuring the many good farmers who are doing the right thing; but they are, as compared with the mass, like plums in a school

pudding, "few and far between." It is best, in a great question affecting the national welfare, to tell the truth, however unpleasant. Of 550,000 holdings in England, Scotland, and Wales, we have as holders of less than 20 acres :—

| | |
|----------------|---------|
| England | 211,465 |
| Wales | 26,534 |
| Scotland..... | 43,929 |

Total under 20 acres...281,920

and still these only occupy 6 per cent. of the whole area.

How many well-cultivated holdings are there out of these 550,000 returns? Again, in Ireland, there are between 500,000 and 600,000 holders of land. How many of these are perfect farmers? We may safely assume that there is room and profitable occupation for many hundreds of millions sterling to be invested in British agriculture; but before this can take place what a thick crust of old customs, beliefs, and prejudices must be broken through, and what a long and hard job it will be; but we must keep "pegging away" with right good will, and in 100 or 200 years British agriculture will be changed, and Mr Mechi will then be looked upon as one of the old school of farmers.

I shall, therefore, with these convictions on my mind, continue to "peg away," regardless of envy, hatred, malice, and all uncharitableness.

My present estimate of British agriculture is—Tenant's capital, £5 per acre; gross saleable produce under £4 per acre. In my case, they are three times these amounts. One-third of our population depend upon foreign supplies for their daily bread, and meat is becoming a scarcity. Is this creditable to the richest country on the globe? Its land half-farmed, and its untold millions lent to foreign nations (witness the present French Loan), rather than more profitably invested in food production at home.

Land will never be extensively improved until its transfer is made quick and cheap—by identity and possession. We can transfer £100 or £100,000 in the Funds in half-an-hour by a payment of 2s. 6d. per cent. Mr

g Orange variety; others claim that the white Belgian gives a greater yield. For the use, the smaller French Horn variety is preferable; it matures earlier, and the flavour is milder.

In field culture the rows should be 18 inches apart, and the Carrots 6 inches apart the rows. In gardens the rows may be 10 inches apart, and the Carrots 3 or 4 inches apart each other. In either case vigilance must be exercised not to let the weeds get a start of the crops, as the Carrot is of feeble growth at first, and if once choked and smothered by weeds seldom recovers. They may be sown in the spring as soon as the ground is dry enough to be worked, and 4 or 5 lb. of seed are sufficient for 1 acre. As the seeds are covered with a beard, which renders even sowing by a drill-harrow difficult, they should be mixed with sand and thoroughly rubbed before being put into the sower. The seed should be fresh, certainly not over two years old.

Johnston gives the composition of the carrot as follows:—

| | |
|------------------------|--------|
| Water | 80.00 |
| Starch and fibre | 9.00 |
| Pectin | 1.75 |
| Sugar | 7.8 |
| Albumen | 1.1 |
| Oil | .35 |
| Total..... | 100.00 |

Others make the per-centage of water higher, running up to 88 per cent. Carrots, like all other root crops, draw heavily on the inor-

ganic matter of the soil. A crop of 20 tons of roots and 4 tons of leaves to the acre will exhaust the following amounts of inorganic matter:—

| | |
|--------------------------|--------|
| Phosphoric acid | 39 lb. |
| Sulphuric acid | 57 „ |
| Lime | 197 „ |
| Magnesia | 29 „ |
| Potash | 134 „ |
| Soda | 103 „ |
| Chloride of sodium | 85 „ |

In all 644 lb.

Wood ashes are therefore a good fertilizer for Carrots, as they supply all this inorganic matter. Plaster, lime, bone-dust, and common salt are also good, but do not furnish all the elements required.

The leaves of Carrots are beautiful, and as valuable as they are beautiful. The common practice of leaving these leaves on the field at harvesting is wasteful. They may do the land a little good, but they will do the cows and horses a greater good. They are highly ornamental, used as greens in the arranging of flowers. No green is more light and graceful. If a large Carrot, in the winter, be placed in a vessel of water on the mantel-piece, it will send out numerous delicate leaves, which will serve to cheat winter of its gloom. Another mode is to cut off the top of a Carrot, and partially hollow it out so that it will hold water, and hang it up in a window, furnishing it occasionally with a little water. The graceful living green leaves make a pleasing contrast with the general deadness of the winter.

THE POTATO DISEASE AND ITS CAUSE.

THE potato disease has appeared to an alarming extent in the Vale of Severn, and to a greater or less extent in most other parts of the country. Year after year, during the last quarter of a century, we hear of the ravages of this disease, yet no effectual means have been proposed by which to check its progress or its annual visitations to our shores. Cholera, in former years, was a scourge which carried off numbers of people; but in modern times, thanks to the progress of the age and the attention that has been given to sanitary and dietary matters, its deadly effects have been greatly modified. A few years ago the silkworm was threatened with extinction in Europe by a disease which at first baffled the skill of sericulturists, but by the aid of science, this disease has been mitigated and promises to be totally got rid of under judicious treatment. As with animal diseases, of which numerous other instances could be given, so with vegetable. Proper treatment, if it does not eradicate the disease, may at least reduce its destructive nature within the smallest compass.

During the years when the potato disease became first known, various suggestions were put forth in order to the protection of the potatoes; but some of them were absurd, and others, when acted upon, were attended with no effect. Before we can properly deal with the potato disease, several things have to be taken into account, such as variety of potatoes, aspect of fields in which they are planted, soil, drainage, and the time of sowing the seed. On farms in which these things are neglected, and on which the crop is left to chance, the disease has been found to make its appearance in its severest form.

Before we allude to these matters in detail, it is essential that we should inquire into the nature of this disease, and by doing so, arrive at the origin of it.

The potato disease is always reported to have made its appearance in the vicinity of

the sea coast, in fields with a south or south-western aspect, or in fields composed of rich loamy soils and sheltered on the north and east by woods or clumps of trees. It smites the haulms of potatoes (and simultaneously with them the tubers) of varieties with rough, large, and pointed leaves, but it becomes perceptible on the haulms of varieties having smooth, small, and somewhat rounded leaves. Potatoes grow best in sandy soil, in an open situation, and do not incline to the south or west, but they may escape the disease, provided they are of a variety of the latter kind which we have not yet instanced, and sown early in the spring time. The foregoing, we believe, is a summary of the places, &c., in which the disease first makes its appearance, according to soil, aspect, and variety of tubers concerned.

The first evidence of the malady is small burnt-like spots on the leaves. On close inspection it will be found that the lower portion of the haulm, from the point at which the foot-stalk of the leaf which bears these spots join downwards, is more or less damaged, while from the point at which the footstalk of the leaf joins the haulm upward is uninjured. By lifting the tubers out of the soil, it will be observed that the lower or further portion of it from the root is destroyed, while the more mature part of the tuber is unaffected. These features of the disease are well known to every agriculturist who has examined potatoes, and are within the province of science to admit of explanation. The simplicity, and to nothing else, we can refer to the potato disease. At this statement persons will exclaim, "Nonsense!" "Nonsense!" "The man who says so is dreaming!" However, expressions of this kind cannot withstand truth and fact. The simple, which, on demonstration, are simple, are not, therefore, le

After a thunderstorm, the disease may make its appearance, but the electricity or lightning from the storm clouds do not cause it, but electricity produced from the formation of watery particles in the shape of dew-drops. The atmosphere abounds in electricity, but with the production of lightning in storms we do not propose to deal, but to confine our observations to the minute electric fluids (if electricity can be indeed termed a fluid, but for the purpose of our remarks we will call it such), produced by the vapours which are condensed into dew-drops. From experiments made by M. Le Monnier, at St Germain en Laye, and communicated to the Academy of Sciences at Paris, the amount of electricity in the atmosphere was estimated. Le Monnier caused a pole to be fixed vertically into the ground, which, at the height of 32 French feet, bore an insulated tin point, from which the metallic wire conveyed the electricity to an electroscope, or any other convenient apparatus for its examination. The result was that some electricity might always be detected in the atmosphere; that in dry weather it was scarcely perceptible at sunrise, but increased gradually until three or four o'clock in the afternoon; it then diminished till the *evening fall of dew*, at which time it *increased*; and by a subsequent diminution it became almost insensible at midnight. The electrical state of the atmosphere has been practically investigated by others with equal or similar results.

From the foregoing it appears that the change of the moisture of the earth, by the heat of the sun during the day, into vapour, produces electricity, and that also the change from vapour into dew causes also an increase of electricity. This change of vapour into visible watery particles in dew-drops is more perceptible on vegetation than, for instance, on gravel walks, &c. This is because vegetation, such as grass, &c., being pointed, offers greater facilities for the radiation of the sun's heat, and thereby offers a cool surface to the atmosphere before rounded and smooth objects do, and consequently retain on them a greater amount of watery particles; and also a greater quantity of electricity is pre-

sent. Electricity seeks the earth, and the sap of plants frequently forms for it a conductor. The rough, large and pointed leaves of potato-plants are such as to present to the atmosphere a cool surface much sooner than other objects, and consequently they receive a larger quantity of dew. As a sequent in the formation of this dew, especially in hot weather after very much rain, in a moist soil, proportionately a larger quantity of electricity is formed in close proximity to the leaves on which the dew is deposited, which seeks the best conductor for it into the earth. The sap of the soft haulms of the plants afford this, and the electricity is conducted to the tubers. For the same reason, the part of the tubers which contain the most succulent matter and are lowermost in the soil, receive the strength of the current and are destroyed.

In localities with a southern aspect, especially after rain in summer, owing to a higher temperature in comparison with open districts and with northern or eastern aspects, there is a greater amount of vapour, and also a heavier deposit of dew, so that in such localities the potato disease is known to make its first appearance in the vicinity of the sea coast, because of saline properties there is always more moisture to be evaporated, which adds to the formation of dew.

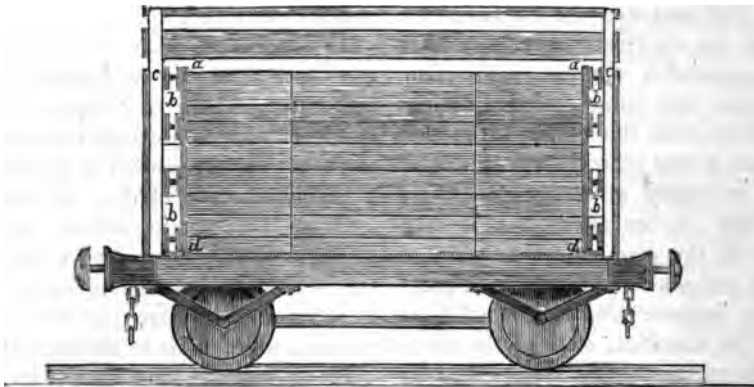
Small, smooth, and round-shaped leaves, and potato plants which do not spread luxuriantly on the surface of the ground so as to prevent a free circulation of air, are less susceptible to disease than those varieties which, so to speak, grow apace with large and rich foliage. The disease makes its appearance when the greatest amount of moisture is on the ground, and at a time when the foliage is so thick as to prevent a current of air from passing underneath them and dispersing the vapours produced by the sun's rays in the hottest part of a summer's day. These vapours, by being concentrated in the evening, add to the increase of the dew deposit, increase the production of electricity, and thereby generates the destructive malady.

TRANSIT OF CATTLE BY RAIL.

FOR some time back this subject has now and again turned up, and many able reports and suggestions have been made with a view to lessen the sufferings consequent on the transportation of the bovine and ovine race by rail. There are numerous different heads under which one could treat the transit of all animals, both by road, rail, and sea; and, again, by subdividing those different heads a very long paper on the subject could be produced. But as the object at present is only to bring before the public a plan of padding, as it may be called, for cattle trucks, I will confine my remarks to the

the way of padding at each end of the truck would be of undeniable value for lessening the injurious effects of those sudden shocks. Many plans of padding have been recommended, but one objection applied to most of them, and that was, the difficulty of getting them thoroughly cleaned and disinfected, thus increasing the already great chance of healthy stock catching disease while in transit from one part of the country to another.

You will observe, in the accompanying longitudinal section of a cattle truck, the ends are made, as it were, double; *c* represents the end of a cattle truck as it now



Improved Cattle Truck.

truck, and therefore beg to accompany this with a sketch of the proposed padding.

Some years ago, a very able "report on the transit of stock," by Mr Menzies, Trentham, was awarded the premium of £100 by the Highland and Agricultural Society of Scotland. In this report, Mr Menzies proposed to lessen the sufferings of the animals by padding the ends of the trucks. He suggested that the ends should be made double, and that the padding should be made of strong back bars, resting on a runner at the bottom, and attached to the end of the truck by strong spiral springs. This padding, he said, would keep the lining, say 6 inches, out from the end proper of the truck; but on the end being forced against it, by a sudden shock either one way or other, it would yield, just like a strong spring mattress. Now, the advantage of this spring padding over that already adopted, is, that it can be thoroughly cleaned and disinfected, two conditions very desirable in all things connected with cattle trucks.

stands, and *a* represents a lining of wood with strong back bars; this lining rests on a runner, *d*, at the bottom of the truck, and is attached to the end of the truck by strong spiral springs, *b*, which, in its usual position, would keep the lining, say 6 inches, out from the end proper of the truck; but on the end being forced against it, by a sudden shock either one way or other, it would yield, just like a strong spring mattress. Now, the advantage of this spring padding over that already adopted, is, that it can be thoroughly cleaned and disinfected, two conditions very desirable in all things connected with cattle trucks.

AGRICULTURAL PROGRESS IN IRELAND.

IT is always a pleasing duty to chronicle the advance of agriculture, and especially that of Ireland, because following in the train of the progressive improvements of rural pursuits are benefits of incalculable good to the country in general. In Ireland, at the present time, agriculture may be said to be awakening to energy. The inventive genius which has favoured the present generation of agriculturists in the matter of improved machinery, has not been without its due effect upon our brethren across St George's Channel. Under the progressive agency of the Royal Irish Society, Ireland possesses some excellent "crack" stock, and good plump animals are seen roaming over its rich pasture land; while the Land Act is gradually unfolding to the outward world the defective machinery which united the interests of landlord and tenant. Irish agriculture, therefore, is beginning to throw off the inertness which formerly hung about it; and, from the pleasing accounts which reach us from nearly every part of the country, we observe the results of untrammelled action in the elevation of the cultivators of the soil, and the blending of the interests of owner and occupier.

The Commissioners of Public Works, in whose hands are vested the power of making grants of public money under the Land Act, have just issued their report on the financial year, 1871-72. In that year, they state, advances reaching a total of £161,202 were made. Of this sum, £82,555 were granted to proprietors who improved their estates under the Lands Improvement Act; and £45,830 to tenant-farmers to enable them to purchase their holdings under the provisions of the Landlord and Tenant Act of 1870. The total extent of land purchased with the aid of loans from the Board of Public Works, since the Act passed, is set down at 5564 acres; the annual rent, £3909; the purchase money, £89,148; and the total amount advanced to

tenants buying up their holdings at £56,549. It is stated as a fact of some significance, that under the forty-second section of the Act, which provides for advances to landlords to enable them to discharge a tenant's claims for compensation for improvements, there had been, up to the end of May, only two applications. This, of course, is, to a certain extent, a result of the purchase of farms by tenant-farmers, but doubtless, to a greater extent, the application by the landlord of his own capital to improving his estate; and the latter would seem to be more generally the cause from the fact, as stated above, that no less than £82,555 were demanded by proprietors for the improvement of their estates.

The reports of the various inspectors throughout the country are exceedingly interesting, and it will not be out of place to reproduce extracts indicating, as they do, the working of the Land Act. The first report, from Mr W. Sidney Cox, inspector for Limerick and neighbouring counties, says:—"In 1870 I certified for works executed to the value of £10,259; but in 1871 for only £6671. I account for this difference in two ways:—First, and principally, I attribute it to the Land Act of 1870, which has very much deterred landlords from seeking for loans to be applied to properties in the occupation of tenants; and, secondly, to the greatly advanced value of labour, it being impossible in some districts to obtain a couple of dozen labourers at any such price as would render land improvement works a profitable investment of capital." Mr J. Fishbourne, inspector for Carlow, &c., also says:—"Labourers are not now plenty; their wages have increased to nearly double what they were twelve years ago; the price of the necessaries of life has also increased, and wages of persons generally throughout Ireland have increased."

The account from Mr I. Jocelyn Poe, inspector for Tipperary and Clare, is more favourable. He says:—"The appli

tions for loans for farm buildings have increased, and I anticipate a progressive improvement and increase. Loans for building labourers' cottages must become more numerous; the difficulty of getting labourers, even at 50 per cent. advance on the rate of wages paid ten or twelve years since, unless suitable habitations are provided for them, will increase every year, and landowners who reside any distance from towns must provide houses for their workmen on their lands, and even with this inducement they do not find it easy to get good men."

The report of Mr W. P. Prendergast, inspector for the North Western District, is especially worthy of note:—"The applications for new loans," he says, "have not been numerous, as owners do not, for the most part, feel disposed to expend money on farms in the hands of tenants, and the greater number of resident landlords in these counties had already improved the land in their own occupation; but wherever any ground falls under the immediate control of a proprietor, there is ample proof that drainage and other improvements are far better understood than in former years, and that it is not from any objection to the terms of the Acts, or to the regulations of the Board, that the fund is not more frequently resorted to. I find in all quarters more attention paid than hitherto to the question of improved dwelling-houses and offices for farmers and labourers, and the advance of money at 5 per cent. to clear both principal and interest in thirty-five years has been considered a most useful and liberal provision. . . . The improvement in all newly-constructed country-dwellings is accompanied by an equally marked change in dress furniture and food among the labouring classes. The houses are better furnished, the food is more substantial, and the labourers are more comfortable. The improvement in the farming district is a great benefit to the labourers

wages is expended on them, and shops with modern imported articles of dress are now well supported in the same towns and villages where no such things were seen prior to the potato failure. New banks have also been established in numerous towns, frequented exclusively by farmers, and which have not increased in size, but derive their business from the agricultural profits brought in. The breed of live stock of all kinds—cattle, sheep, pigs, and poultry, has vastly improved. Prices for all farming produce, especially what is sold by the smaller farmers in this district, such as butter, pigs, eggs, and poultry, have risen so much that the rewards for exertion are felt to be quite different from what were formerly known, and the use of money is better understood by the rural population, so that while higher wages are demanded than employers ever before paid—and some check is said to be given to works of drainage and land improvement from this cause—it can only be considered as a temporary stoppage, similar to what occurs in manufacturing enterprise."

The last-named inspector sends a letter from an owner, resident in Sligo, who, during the last twenty years, has effected great improvements on his estates with the aid of loans from the Board. He gives an account of his drainage and its successful results, and adds that there is scarcely anything permitted by the Board which he has not tried. With the exception of labourers' cottages, every step taken has paid him well. Hill tops, he says, fenced off for grazing, were the best investment, and the profits of a farm of his had been increased from £176 to about £1000 a year. He adds:—"It has always been a foolish thing to drain lands for tenants, though I have done it largely. For some years, at least, they must be closely over-looked, or they would let the work go to the dogs. However, they learn to appreciate the benefits. Furthermore, it is remembered that by improving them and you put it in their power more thoroughly to exhaust it. I have ever found that the part of the farm that was most impracticable to bring into

fertility was exactly that part which the tenant could cultivate easiest, and for which he paid the highest rent. The late Bill has placed the landlord completely at the power of his tenantry. He can exercise no control over their husbandry, however mischievous or detrimental it may be ; and, therefore, for the reasons I have given, coupled with the difficulty of getting hold of land to square the farm (always necessary before attempting to drain), I have determined to abandon all further attempt at reclamation, at least on any land that may not be in my own hands. I regret it much, for it has hitherto not only

paid me well, but has proved of immense benefit to my tenantry, to whom I have, up to this time, given constant employment to every man that would take it during the winter months ; and vast has been their improvement in comfort, in respectability, and general conduct."

The spread of scientific education among farmers in Ireland would, no doubt, obviate the difficulty referred to ; landlords would have more confidence in their tenants, and tenants would be less inclined to pursue a "mischievous and detrimental" course of husbandry.

EARL SPENCER ON IRISH AGRICULTURE.

THE speech of Earl Spencer at the dinner of the Royal Agricultural Society of Ireland is always interesting, and this year is no exception to the rule. Replying to the toast of "Prosperity to the Country," he made reference as follows to the agricultural condition of Ireland :—

There is nothing more important than the cattle of the country. It is always well to see how far the cattle have increased or diminished during the year. At the present time it is a matter of the deepest interest, as we all know to what high prices meat has risen in the sister country of Great Britain. I am glad to say that the returns are favourable to Ireland in two respects, both as to the stock in this country and the exports to Great Britain. I have been informed that all cattle have increased in Ireland, in 1872 over 1871, to the number of 2252. The only class of stock that has diminished are pigs, which number 234,000, but, if we take the value, we find an increase to the amount of £276,526. That, I think, will be gratifying to you as members of the Royal Agricultural Society of Ireland. In England, on the other hand, stock has diminished, notwithstanding the large exports from this country.

The exports from this country are very remarkable, particularly from the latter half of 1871, amounting as they did to £160,881, whereas, for the corresponding period of 1872, they amounted to £260,117, an increase of £99,236. Now, from these figures I think we may draw two very useful lessons. It shews to the farmers of this country, who have been very careful of their stock, that they have not been tempted by a sudden rise of prices in England to send off the stock on which they must always depend for increasing the produce of their herds. In England, I think, during the years when there was a very great drought, the farmers were obliged to diminish, in a most dangerous manner, the stock they had on their farms ; and I think it is to this, and to the greatly increased consumption of meat, is due much of the diminution of stock in Great Britain. I think that in another season we may draw from the larger quantity of stock that is sent over from Ireland to Great Britain ; that the Scotch and English value very much the cattle that they get from Ireland ; that they have found the Irish stock very useful in their farms ; and, moreover, it shews that the restrictions that are put on the importation of cattle have not been imposed in vain,

We have often heard that the rules and regulations which have been made by the Privy Council, in reference to the importation of cattle into Ireland, have had a very injurious effect upon the country; but I think that the statistics which I have quoted will shew that these regulations have no such effect as that. At this moment, when that dire enemy of farmers, the rinderpest, has appeared upon the shores of England, it is worth while, acting on the wish for the protection of their own stock, for the farmers to submit to any regulations that might be necessary in order to drive away the fearful calamity from our shores. We may congratulate ourselves that the experience which we have had in former years in England caused the Government of the country to take exceptionally severe measures for the prevention of the rinderpest being imported from England, by means of these regulations. I hope that the plague has been stayed in the various parts of the country in which it has been discovered, and I sincerely, as we all sincerely, hope that we shall not be visited with this terrible disaster. Since I came to this country I know of what importance it is to those who reside in this province; but I wish I could congratulate the Society on the success of the efforts which have been made for the promotion of the growth of flax in other parts of the country. I believe that the cultivation of flax is one of extreme difficulty—that it requires the greatest possible attention to bring it to maturity; but it is hardly to be expected that it would be suddenly and rapidly introduced into the part of Ireland where it was not hitherto known upon recent years. Her Majesty's Government

had made a grant for the extension of this object. Although they had the advantage of the assistance of the Society, I regret that the Government were not more successful in the extension of the cultivation of flax in the western and southern provinces of Ireland. It shews how extremely difficult it is for the Government, by mere grants of money, to force any new branch of industry into the country. There is, however, another mode of Government assistance which has been more successful than applications for public money. I refer to the applications for loans that have been made. I once before, in 1869, referred to the improvement in property which resulted from the advantage that was taken of the public loans taken from the grants by the Board of Public Works in Ireland. It appears that £84,000 were issued in 1869 and 1870 in the way of loans by the Board of Works in this country for the improvement of the land. I thought it would be satisfactory to find how much was done in this way last year, and I find there was an increase, and I find also that the largest sum paid by the Board of Works was paid last year. In 1869, when the sum of £82,550 was advanced for that purpose, one-half being for farm buildings, I think that shews that, although there may be still, in some places, hesitation as to the working of the Land Act, that measure has not stopped improvement on the part of the owners of farms—a statement which was often made when the Land Bill was being discussed and before it was passed. I am glad to refer to that fact, and I think that after mentioning it I may make no further reference to figures.

BISHOP ELLICOTT AND THE AGRICULTURAL LABOURER.

A CORRESPONDENCE has just passed between the Bishop of Gloucester and Bristol and the Secretary of the Gloucester district of the Agricultural Labourers' Union, with reference to the remarks on the labour question made by his lordship at the dinner of the Gloucester Agricultural Society, and which, it will be remembered, formed the subject of comment in the House of Commons recently.

Mr Yeats, the Secretary referred to, first wrote the Bishop a letter calling in question the accuracy of some of the statements made in his late speech, and, while expressing himself ready to receive any advice his lordship might offer, assured him that the object of the Labourers' Union was not to engender bad feelings between master and men, but to promote a better feeling among all classes. To this letter the Bishop replied that the drift of his speech was, as plain as words could be, that the agricultural labourer ought to have higher wages, and he commended those who raised them. More than that, he had pointed out that it rested on the clear principle that money would purchase now less than it had done, and therefore ought to purchase less labour. As to professed agitators, he condemned them as being enemies to all peaceful adjustments, and he would not retract one word of what he had said. But judging from Mr Yeats' letter, the Bishop said he thought Mr Yeats, and those who co-operated with him, were very different sort of people, and invited Mr Yeats to bring any half-dozen or more labourers to his residence, and he would both hear them and tell them face to face what he thought was the duty of all in these trying times. That, he thought, would be a much fairer way of dealing with him than, on the instigation of an unfair article in a newspaper, condemning him for sentiments which the whole tenor of his speech flatly contradicted.

Mr Yeats was unable to get half-a-dozen labourers to accompany him at the time appointed (Saturday evening), and communicated with the Bishop to that effect. On Saturday morning, the Bishop wrote to Mr Yeats, expressing his sorrow that he would be unable to bring his friends, and saying that when he could do so, he would most gladly meet them, and enter with all his heart into their case. The Bishop stipulates that the men who meet to confer with him must belong to the county or diocese, and then adds:—"That you may know exactly my present views and feelings as regards the agricultural labour question in Gloucestershire, I will briefly repeat the three points of my recent speech. 1. That our Gloucestershire farmers have, for the most part, dealt fairly with their men hitherto, and that now, in the altered state of prices, they are preparing to deal fairly and to raise wages to the point to which they certainly ought to be raised. 2. That it is wrong and utterly unjustifiable for strangers who can know nothing of our local circumstances, to come among us and to stir up dissension and set class against class. 3. That we ought not to send our Gloucestershire men away from us to other counties, but to study to make them happy and contented at home. This is the substance of what I said, and of what (as at present advised) I abide by. Of course I feel it possible that I may be wrong to some extent as to (1); but this I solemnly declare, that during the nine years I have been in this diocese, no cases have ever been mentioned to me of unfair wages having been systematically given in any parish that I have visited, and I certainly have spoken freely with all classes, and have made very free inquiries. Had I heard of such, I certainly should have thought it proper to allude publicly to the matter, and to have done my best to bring about a change. I am, of course, here alluding to past years

During the last two years we have been passing into a new state of things, and it is to this new state of things that our attention has most seriously to be turned. I have inquired anxiously, and I have certainly arrived at the conviction that our Gloucestershire employers are meeting fairly the altered state of things. The general design of my speech was to encourage them to go onward, and to follow the many good examples which are being set them throughout the country. It is wiser, as well as more charitable, thus to seek to lead

others rather than to attempt to urge on harsh charges or exaggerated expressions men who are prepared to do their duty. Englishmen may be led, but will not be driven. The truest friends of the labourer are not those who make the greatest professions, but who humbly endeavour to do justice to both sides." Mr Yeats had a long conference with the Bishop on Saturday evening, but it was private. It was settled that his lordship should meet labourers about the latter end of September.

The Garden.

HERBACEOUS PLANTS.

ÆCÆNA NOVA-ZEALANDICA.—A most interesting and pretty alpine, forming dense dwarf tufts, and curious crimson flowers, which appear in late spring and early autumn. The other species of this genus are in no way specially interesting.

Aconitum (Monkshood, or Wolf's-bane).—These are very hardy herbaceous perennials, mostly tall growers, with beautiful flowers, all more or less poisonous, consequently should be admitted with caution.

A. lycoctonum.—Grows about 3 feet high, with small spikes, bearing a few narrow yellow flowers. This species is of alpine origin, and may be used as a rock plant, in which position the growth would naturally be much shorter. The leaves are broader than in most of the other species, cut half way down into three lobes, doubly trifid, side ones deeply two-parted; flowers: July and August.

A. Napellus.—This species has simple tuberous roots, the properties of which are extremely poisonous; stem strong, erect, 3 feet high, terminated by a dense cylindrical spike of dark blue flowers; the leaves are deep green, shining, divided to the petiole. The white, blue and white, and purple varieties of this species are amongst those most recommended for the mixed border, and are usually in flower in July.

A. pyrenaicum, with large palmate leaves; **A. Cammarum** with blue flowers, shaded purple; **A. barbatum**, the dwarf blue; and **A. autumnale**, as a late blooming kind, will be sufficient for most collections. All the sorts are easily increased by division of the root, or by seeds, which should be sown in autumn. If sown in spring they generally lie dormant until the spring following. Most of them prefer a shady border. Such-like plants succeed better in a shrubbery.

Actæa spicata (Baneberry).—A rare native perennial plant, sometimes seen in cottage gardens in the north of England, but is liable to die out unless the soil is moist and the situation shady; the flowers are pure white, and succeeded in the autumn by dark brown berries, about the size of Peas. These are said to possess some poisonous properties. A useful plant for the shrubbery, or any shady damp corner where few other plants will grow.

A. racemosa; syn. **A. americana** (Black Snake-root).—This species and its varieties alba and rubra are also interesting plants, natives of North America, are quite hardy, and flower freely in this country, but do not perfect their fruit. The root of this plant is used in North America as an antidote against the poisonous bite of the rattlesnake, &c.

Adenophora.—A sub-genus from Campanula; hardy perennials, chiefly natives of Siberia, fine rock or border plants, with blue flowers. The following are a selection—**A. masupiflora**, **stylosa**, **communis**, **latifolia**, **reticulata**, and **suaveolens**, are increased rapidly either by seed, cuttings, or division.

Adonis vernalis.—A beautiful spring flowering rock plant, with large yellow flowers, from southern Europe, nearly allied to the Ranunculus; grows freely in almost any soil or situation, increased by division of the root; seedlings of this plant make very slow progress.

Egopodium Podagraria.—This is a native plant, called Ash-weed in some parts of England; very interesting, the umbels having fourteen rays; would grow at the back of a rockery, under trees, or in other shady situations where few other strong perennials would grow; spreads fast when once established.

thing of the sort, for there are a quantity of plants which yield sweet-smelling flowers, and are of the most easy culture ; indeed, they may be grown to as great perfection by those possessed of only a small garden, as by those who glory in an extensive horticultural establishment. There are many advantages in cultivating sweet-smelling flowers in a garden. In the first place, it greatly enhances the pleasure ; in the next place, how delightful is a bouquet of these fragrant flowers in the house, especially in the sick room ; and

Much has been said and sung in praise of the Rose, and by none more pleasantly than by her great champion who presided at the anniversary of the Gardeners' Royal Benevolent Society in July of the present year ; nevertheless, the theme is never wearisome, but, like the delicate fragrance of the flower, is ever new, ever grateful, ever enjoyable. The most odoriferous, perhaps, of all the varieties we have is still the old Cabbage Rose, and those varieties belonging to the section of Tea-scented. Well do I remember



A group of Sweet-smelling Flowers.

then we are told by scientific men that these plants are great ozone producers, and thus they become great promoters of health. In order, therefore, or with the hope of fostering the taste for such plants, I here offer a few remarks upon the management of a few kinds, so that sweet-smelling flowers may not be confined to the wealthy, possessed of large gardens, but may flourish, and make glad the hearts of villa residents and cottagers.

At the head of any list of sweet-scented plants stands the "queen of flowers," the Rose, and not by courtesy only, but by right.

the happy days of boyhood, when in my village home I gambolled amongst my mother's Cabbages, and Cabbage Roses, too, drinking in the delicious fragrance of the latter, and picking caterpillars off the former ; but I loved those Roses, and do still, with a love that not all the grand varieties which have been introduced to our gardens can shake or diminish ; and though I love these our fine modern Roses, I do yet regret that the old Cabbage Rose is not more extensively grown. The Tea-scented Roses are exquisitely sweet—a little tender in constitution, perhaps, for an amateur or cottager, but these may be

shifts, and using more rotten cow manure in the soil than in that used for ordinary pots; and the first week in August is quite late enough to give the final shift before winter. Carefully keep all blooms picked off until the end of September; after this, they will continue to bloom all winter, but I do not like the young plants to flower at all the first season. Tree-Mignonette requires careful

watering, and an abundance of light and air, but soon suffers in a draught. Some amateurs assert that Mignonette is not worth growing in winter because it has no perfume. This is a mistake, however, for it only requires to be placed in a slightly warmer temperature to bring out its delicious fragrance. — *Vive Vale.*

[To be continued.]

A GROUND VINERY AND ITS MANAGEMENT.

A GROUND Vinery affords a very simple means of growing the Grape. By its use the beautiful and delicately-flavoured varieties, such as Black Hamburg, Royal Muscadine, Sweet Water, Foster's White, &c., can be as easily grown as an ordinary garden crop, provided that a dozen or two boxes of glass, about 20 feet, can be had for each Vine.

A thrifty one-year-old plant is set in a good bed of soil, in a part of the garden fully open to the sun, but sheltered from rough winds; and after a summer's growth under a sash of glass, it is cut down to about two buds in November, and covered with a little mould, and a board to repel frost and mice. In the spring only one shoot is allowed to grow—the strongest; and if it is well encouraged and protected it will be strong enough to begin to

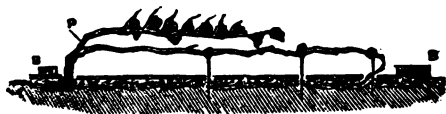


Fig. 1.—Grape Vine in a Ground Vinery.

bear in the third year, and at the same time to grow from its base a similar shoot for bearing in the summer following. These shoots are tied or hooked down to a horizontal position as they advance. A pin of stout wire, bent as in fig. 3, will sustain them when desirable, as well as hold them down.

Fig. 1 represents the two canes (leaves omitted), last year's cane fruiting, and the other

growing to take its place next year after it has been cut off, in November, at p, no other pruning being necessary then, but another cut to take off the weak end of the growing cane, reducing it to within the limits of the glass covering, or to such a length as shews buds capable of fruiting well. All laterals and tendrils have been pinched off it as they appeared during summer, if the Vine has been an object of particular care. The thin lines under the canes indicate slates laid upon coal ashes to repel insects in summer, and mice in winter. This floor is not essential, but is a ready and neat way of keeping a clean surface. B B are bricks on which the glass roof rests, allowing free ventilation all round. It remains to tell how the glass should be used. It is simply wanted like a cap and veil for the head, to break the force or sweep of parching winds, while admitting air and light. No lapping or puttying is requisite, for our glass bonnet must not be tight. We have Vines doing well under a flat window sash considerably cracked and broken, and especially under a show-window, with a row of panes on both its sides, for the Vine is voracious of light, and this side supply is very serviceable. A common hot-bed sash, merely leaned against a wall, leaving an opening along the top, answers well; and in the west of England, where the air is generally humid enough, and glass is chiefly wanted to enhance heat, Vines are grown well in cylindrical or octagonal glazed frames, entirely open at the top

No further care is taken until danger of frost in October, when the frame is turned down, to prevent injury to the leaves until their office is perfectly fulfilled, and the wood and bark fully ripe. In very cold November nights, the foliage still looking fresh, a mat is laid on the glass; and finally, in December, a coat of thick paint, composed of carbolic soap, sulphur, clay, and water, having been applied so as to fill and cover every portion of the cane after being pruned, it is laid flat, covered when dry with coal ashes, old hot-bed manure, and an old door, to keep all dry, and so left to sleep until April.

It should be added to what has been said above about training a renewal cane, that if the frame is found too narrow for two canes of a large-leaved variety, the shelter afforded

makes it quite safe to depend, year after year, upon the single original cane, never cutting it away, but spur-pruning each of its bearing branches. This method is reputed to give finer flavoured but smaller and less juicy fruit than is furnished by a fresh cane of the last year. In the open air, canes are sometimes injured so much by the winter as to be incapable of conveying sap copiously. This liability, coupled with the advantage of having large showy bunches for dessert use, makes renewal training popular.

The common idea that a glass covering benefits the Vine by preventing injurious changes of temperature, is not confirmed by observations. There are greater extremes, of high temperature at least, with the use of a glass covering than there are without it.

A FEW BEAUTIFUL SHRUBS FOR THE SPRING.

AFTER the long dreary winter, our admiration of beautiful flowers becomes somewhat intensified, and we hail the early spring flowers with delight. The earliest of the flowering shrubs may not be any more beautiful than the latter kind, but it is quite natural to study them more minutely, and thereby form a closer acquaintance with their merits. Among the most attractive of those in bloom at the time I write, I consider the following as indispensable:—*Cercis japonica*, or Japan Judas tree. The flowers are produced in such abundance that the branches are hidden from view. The colour of the flowers is a rich bright crimson. This shrub is not so rapid a grower as some of the other species, but it is far superior as an ornamental shrub or tree to *Pyrus japonica*; such as the pink, scarlet, or light crimson, double crimson, and other varieties, are certainly among the most showy of early blooming shrubs.

The double Plum-leaved *Spiræa* (*Spiræa*

prunifolia pleno) is the most showy of the white varieties. The pink and white dwarf flowering Almonds are old favourites, only excelled by the newer double-flowering Plum (*Prunus trilobata*). But when one begins to specify and describe the individual merits of plants, he is very likely to tell a long story; therefore I will only name a few of the beautiful shrubs which were in full bloom early in May, and in view from my library window:—*Andromeda floribunda*, *Cassandria calyculata*, *Caragana*, in variety; *Azaleas*, hardy early Chinese sorts; *Hawthorns* in variety; *Lilacs*, many sorts; *Rhododendrons*, a few foreign species and varieties; double Chinese Apple (*Pyrus spectabilis*); double Chinese Cherry (*Exochorda grandiflora*), a grand shrub in all its proportions; *Viburnum lantanoides*.

The above may be considered as medium early, there being a few which bloom a few days earlier.—*T.*

NEW AND RARE PLANTS.

VIOLA CORNUTA, var. MAGNIFICENT.

AMONGST the many new plants which have this season been introduced to our notice, few will take a higher position for the

be able to appreciate the great improvement in size. It is a plant suitable for any garden being perfectly hardy, and when once established, presenting a gay appearance from April until late in the autumn ; thus, it is at



Viola cornuta, var. Magnificent.

be able to appreciate the great improvement in size. It is a plant suitable for any garden being perfectly hardy, and when once established, presenting a gay appearance from April until late in the autumn ; thus, it is at

be able to appreciate the great improvement in size. It is a plant suitable for any garden being perfectly hardy, and when once established, presenting a gay appearance from April until late in the autumn ; thus, it is at

spread out, forming a delightful clump. Its foliage is abundant, and dark green, above which its large flowers stand up. They are not thin and flimsy, but of good substance, rich violet in colour, with a small yellow eye, this being surrounded by rays of purple. For the

appreciated *Violas*, which we strongly recommend especially to the attention of our amateur readers.

We have been favoured by the kindness of the Messrs Veitch, of Chelsea, with the



Fig. 2. — *Aralia Osyana*.

illustration of this *Violet* we are indebted to Mr B. S. Williams, of the Victoria Nursery, Upper Holloway, London, who, in this plant, has the good fortune of this year distributing the third variety of these improved and highly

following illustrations of new plants. They will prove to those who have not grown them, and who are in a position to grow them, valuable helps for the various purposes of plant decoration. The *Vanda cœrulescens* was

found by Lieut.-Col. Benson in Burmah, and the *Aralia Osyana* and *Croton Veitchii*, by the late J. G. Veitch, whose enterprising energy we have had oftener than once to pay tribute to. That gentleman found them among many other valuable decorative plants, in the South Sea Islands, and they have had, since they were sent out, an extensive sale.

ARALIA OSYANA.

This *Aralia Osyana*, fig. 2, is a handsome hard-wood-like growing plant, of the most elegant proportions. As will be seen on reference to the engraving, the leaves are oblong, and with very prominent mid and inferior ribs. The ground colour of the foliage is a pleasing green, contrasting well with the chocolate brown of the mid-rib venation, and extremity of the leaves. They are generally placed on very decided foot-stalks, and are placed wide enough apart to shew their distinctness of character. They also arch very gracefully over, and stand upon the stalks, arranged rather on an elevated plane. This plant is particularly useful for taking a place among Palms, Ferns, as a part of furnishing, that contrasts well with flowering plants, be they of tall stature, such as the trained *Allamandas* *Bouvardias*, and such-like beautiful plants that are to be seen in all collections, or among the lesser deciduous flowering plants, such as *Gloxinias*, *Achimenes*, and other things that come in so well in summer for filling up the gap that takes place by the transference of half-hardy flowering plants out-of-doors.

This plant is best cultivated in a peaty soil, with the usual proportion of sand, and a little lime. It is an intermediate plant, and is very freely among the plants that are a sort of intermediate between the hard-wood-like and the soft-wood-like plants. It is contained in the collection of plants that are selected for the purpose of illustrating the various novelties in Crotons.

one of its members for illustration, are of the highest ornamental aspect. They take rank in the stove conservatory, at the flower shows, and as individuals for bouquet-making of all kinds. We do not know a more beautiful or a more distinct coloured plant than the famous *Vanda cœrulea*. We present, for our readers' notice, a plant beautiful in itself, but by no means an equal for the one to which we compare it. All plants are not showy alike. Many please the multitude that do not please those who are apt judges, and some do not please the multitude that please these so-called apt judges. The subject of our engraving, fig. 3, is one of the latter. It is a plant that adds to the importance of an Orchid collection without being one that would be selected as of the first decorative importance.

In habit it partakes much of the one from which it has been in a measure named, and in flowering character it is not at all unlike it. It has the same azure colour, the same strain of venation, but it wants the size of flower. The spike is longer—you may count more flowers upon it, but these flowers, collectively, do not make the same appearance as the glorious *Vanda cœrulea*. We do not require to say much more to give an idea of its importance amongst a collection of Orchids. Some may think that these Orchids are without the means of many villa owners or occupiers, and so they are; but they are not without the pale of the wealthier portion of this class; indeed, it is to them, and to them mainly, that we are indebted for propagating a taste for Orchid cultivation, and we all the more cheerfully present the portrait, to give those who do not know about its flowering, or other habits, some idea of the character of this lovely Burmese plant. It grows in the mountains of 5000 feet above sea level, and is cultivated in the cool end of the conservatory.

(CROTON) VEITCHII.

We are much delighted at the introduction of the various novelties in Crotons. We felt that it was augmenting the list of a class, that was already well up in popular estimation,

We are much delighted at the introduction of the various novelties in Crotons. We felt that it was augmenting the list of a class, that was already well up in popular estimation,

and we hailed the introduction, especially of a few of the more noted, with tangible signs of delight. Among the many, comes one to us named after the introducers, *C. Veitchii* (see fig. 4). It is of excellent habit, being

breadth, and the young leaves are traversed by broad bands of creamy yellow, which change with age into a rose and carmine purple. The intensity of the colours, too, instead of getting faded, as may be said



Fig. 3.—*Vanda cœrulescens*.

denser than most of the strong growing species, not even excepting *C. pictum* and *C. variegatum*, both well-known and highly prized plants.

As the introducers say, this sort has leaves of from 12 to 14 inches in length by $2\frac{1}{2}$ in

to be the normal state of leaf-colouring, becomes intenser with age. It is one of the sorts that require very little pinching, having a habit of a desirable kind. It is apt to run to seed, and when it does so, the ornamental character of the plant is by no means sus-

tained. It is better, therefore, to grow it in a briskish bottom heat, keeping any growths that have an undue preponderance within bounds. By this means you encourage proper habit, and the leaves are large, and the

will form a useful auxiliary to the class there can be no manner of doubt. We commend, therefore, its cultivation to all whom it may concern, as being a plant useful for the conservatory, for the boudoir, for dinner-table



...and purposes, for window-gardening, and, indeed, for every description of in-door gardening.

NEROPIS FORTUNEI AND C. EXCELSA.

I have noticed in several horticultural works and periodicals that it has become

quite the fashion to ignore the Chusan Palm (*C. Fortunei*), and refer all the examples of that plant now existing in the country to *C. excelsa*, and calling this last species "the hardy Palm." Now, I am quite willing to admit these plants are extremely difficult to distinguish, especially in a young state, yet I do maintain they are distinct, and amongst other points of distinction, *C. Fortunei* is hardy, whilst *C. excelsa* is not, and, therefore, those who refer to the former, by the name of the latter, are not only labouring under a great mistake themselves, but are misleading those they profess to teach. The Chusan Palm, which was introduced by that indefatigable collector, Mr Robert Fortune, and whose name it worthily bears, is a somewhat dwarf plant, seldom, as far as I can learn, making a stem over 14 feet in height. This is somewhat short for its breadth, and furnished with a profusion of rough coarse netted fibre, from which John Chinaman manufactures a rough, and anything but a *recherche* coat; on the other hand, *C. excelsa* is a native of the Himalayas, and forms a somewhat slender stem, attaining a height of from 20 to 30 feet; in addition to this, the petioles of the leaves are longer than in the Chinese plant, and they are armed at the edges, with small teeth-like spines, and the whole leaf is more erect; and, therefore, those amateurs desirous to plant the hardy Palm must procure the Chinese species, and not the Himalayan *C. excelsa*. Let us, however, regard them from another stand-point, and consider their utility as room decorators; and for this purpose they will be found well deserving the attention of amateurs, as they are admirably adapted for the decoration of apartments, halls, or, indeed, any part of the dwelling-house which it is desirable to decorate with vegetable life, saving the dinner-table; and for this place I consider them quite unsuited, because I hold the opinion that plants upon a dinner-table should either be sufficiently low to enable the diner to see over them when seated at the table, or they must have a clear stem of about 15 inches, in order that the view below them may be

clear; for nothing can be more annoying than playing bo-peep round a thick and bushy plant in order to get a word with your friend opposite, and to sit with a massive plant between oneself and a charming friend of the fair sex is certainly most vexatious. Now, under these circumstances, I object to these Palms for table decoration, because they are not sufficiently handsome, when small enough to warrant their adoption, and they do not lose their leaves from the lower part of the stem to enable them to be seen under, until they are a great size—too large, in fact, for table decoration, except where the plants are taken through the table, a system which I certainly do not appreciate; but, as I before remarked, for the decorating rooms, for window plants, either inside or outside, for grouping in borders during summer with other plants, or for planting out singly upon the lawn, they are peculiarly adapted, the fan-like shape of their dark green plaited leaves lending a thoroughly tropical appearance to the scene. And as this is more apparent in a small garden than in a large one, they are particularly deserving the attention of amateurs with but limited space and little or no glass. I have now plants of these Palms which have been used in this manner for three or four years; they grow well, and are of a beautiful colour; in fact, by their appearance it would be impossible to tell if they had stood in the apartments a day, or a month, instead of years. By this, it will be understood, that I am not suggesting impossibilities to the reader, but facts that have been thoroughly tested; and I would therefore urge on my readers the cultivation of these plants as permanent room decorators.

A bountiful supply of water to the roots, and an occasional washing of the foliage in order to remove any dust which may accumulate will be all that is necessary. Avoid large pots, especially in small rooms. I find it very beneficial to my Palms to remove the old soil from the surface in spring, filling up with fresh mould, and thus I retain my plants in the same sized pots.—*Vive Vale*.

BUD-PRUNER AND FRUIT-GATHERER.

THE operation of bud-pruning is usually performed by pinching—the thumb-nail being employed as a cutter when one is required. For ladies, who attend to their own pruning, the thumb and finger become very sore when engaged in the operation; and even to gardeners the thumb-nail

woodcuts. The bud-pruner consists of a metallic thimble, carrying a knife shield. The thimble, fig. 1, is worn on the thumb, and is held in place by four curved strips, which are so arranged as to slightly bind the thumb. The shield, fig. 2, is placed on the second joint of the first finger.



Fig. 1.—Bud-Pruner.

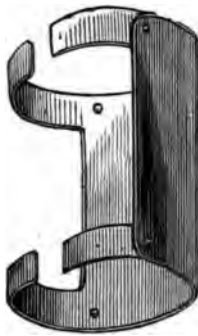


Fig. 2.—Shield.



Fig. 3.—Shewing operation of the Thimble-Pruner.

soon becomes worn and broken. The use of the thumb-nail has suggested the thimble pruner or nail-pruner, the formation and use of which may be readily seen from the

operation of the bud-pruner is shewn in fig. 3. Ladies will also find the bud-pruner very convenient for gathering flower fruit.

The Veterinarian.

THE PREVENTION OF THE CATTLE PLAGUE.

R BOULEY, an eminent physiologist and veterinarian, who has given much attention to the cattle plague, has made a very important report to the Academy of Sciences of Paris, of the proceedings of the International Sanitary Conference, held March 16 of the present year, at Vienna. This has for its special object the determination of the best methods of preventing the cattle plague, and the taking into consideration the question of establishing proper sanitary regulations in regard to cattle traffic between the countries referred to in the convention. Delegates from eleven states were present at the conference, namely, Germany, Austro-Hungary, France, Great Britain, Italy, the Rumanian Principalities, Russia, Servia, Ireland, and Turkey. The delegates included in their number some of the best veterinarians of their respective countries, as also various officers specially charged with the enforcement of sanitary regulations. There was but little diversity of opinion as to the exotic nature of the disease (at least in regard to Western Central Europe) and as to its mode of propagation. It was well established in the opinion that, outside of Russia, it never appears spontaneously upon any race of animals, not even that of the Steppes; and consequently that, whenever it shews itself in a country of its native home, it may be considered as imported. It was also well established that, even after it has continued for a longer or shorter time in a given country, it is only transmitted by contagion, and that it always becomes extinct when the conditions favourable to its propagation cease to exist. It was also considered expedient by the con-

vention to leave Russia entirely out of the sanitary agreement, and not to permit the exportation of its cattle except upon certain well established guarantees.

As to the general question of absolutely preventing the importation of cattle from Russia, it was found very easy so far as Germany was concerned; but very difficult for Austria or Hungary, owing to the great extent of the coterminous boundaries of the two countries, and the dependence of Austria upon Russia for this source of food. It was, therefore, recommended that a careful supervision should be exercised, and that cattle, after crossing the frontier, should be subjected to quarantine of ten days before resuming their journey.

The question being thus settled in regard to the importation of animals from Russia into Austria, the next point that came up for consideration was the nature of the conditions that the several Governments should impose upon themselves toward doing their share to prevent the introduction or spread of the disease; and the measures concluded on as most essential were—first, the immediate slaughtering of all animals that had come in contact with the plague, as also of those which might be considered as under suspicion of having the disease, in consequence of the influences to which they had been exposed, this being accompanied by a proper compensation to the owners; secondly, the burial of the dead bodies of all animals affected with the plague, without attempting to utilize them in any way whatever; thirdly, the utilization of the flesh of sound animals killed under suspicion, but proved after death to have been healthy, this to be permitted only under special conditions rigorously determined; fourthly, the destruction of the germs of the

coats of the intestines—the external layer (the reflexion of the lining of the belly) and the internal layer, and, between those, a layer of muscular tissue, like that by which we are enabled to move our limbs. Anything that gave rise to spasmodic action of that muscular tissue would give rise to an attack of colic or spasm of the bowel. Under different circumstances the malady passes under different names; hence you will hear of windy colic or griping colic, or, in technical language, “flatulent” and “spasmodic” colic. In the spasmodic case the intestines become smaller than ordinary, and in flatulent colic they are distended by the presence of gaseous material. Spasmodic colic gives rise to the same sort of pain as when a man is seized with cramp in the calf. While the bowels are affected in that way, the pain will often disappear in one place, and gradually make its appearance in another place. Flatulent colic differs in this respect, that instead of the empty bowel being constricted, and the calibre of it becoming smaller, it is distended by gaseous material, resulting from decomposition of the contents. What were the symptoms of colic? It may be the horse is well and absolutely at work when his driver suddenly becomes aware of his being a little dull, and in a few minutes he suddenly stops in the road, and will throw himself down before the driver can get to him. Supposing he is taken out of harness and put into the stable, the probability is he will throw himself down and roll about, and strike at his belly, and give every evidence of active pain in the belly. If we take the pulse at that time, we shall find that, instead of being from 32 to 36, which is the normal pulse, it has risen to 80 or even 100 beats a minute, but between the attacks it returns to its normal standard. That symptom is diagnostic of the disease, because in other diseases of the bowels we get no variation in the pulse. In cases of inflammation or strangulation of the bowels, the mucous membrane is congested, and the animal is colder instead of warmer. In flatulent colic, when the stomach is distended by gaseous material, instead of having that violent pain,

and the animal throwing itself about, and the marked periods of time between the attacks, we find the animal exhibits a mere dull pain, looking round at the sides, kicking at the belly, attempting to lie down, and so on, but not to the same extent as in spasmodic colic. Another marked symptom between the two kinds of colic is that in one (the spasmodic) the abdomen presents its usual size, while in the other the flanks are considerably extended.

CAUSES OF COLIC.

Now what are the causes that give rise to these maladies? By knowing the causes and avoiding them, we can avoid the disease itself, which, though not fatal, is to be dreaded because it gives rise to others that are fatal. Exposure to cold is a cause of colic. An animal driven for miles at a pace that makes him heated, is pulled up in the street without shelter, the circulation in the skin is suddenly checked, an abnormal amount of blood circulates internally, and spasmodic action of the bowels frequently results. The same result is produced by giving a quantity of cold water to a horse, especially when heated, which has been a long time without food, as the water, when the stomach is empty, immediately passes into the small intestines. Suddenly changing a horse's food will give rise to attacks of colic. Supposing a horse has been feeding for a considerable period on dry food, and is then unguardedly allowed a quantity of green food (especially if grown in a wet season, and therefore containing a large quantity of moisture), the sudden change of food in the intestines will give rise to spasmodic colic. Indigestible food will very commonly give rise to it, and a horse suffering from indigestion is more liable to attacks of colic than one not so suffering; the food is brought into the bowels in an unprepared condition, acts as a foreign agent on the lining membrane of the gut, and an attack of colic results. Indigestion is perhaps the most fruitful cause of flatulent colic. Crib-biters and wind-suckers, also, are commonly producers of windy colic. A horse suffering from colic, unassociated with any other

disease, will in most cases recover, if the case is taken in hand early and treated properly; but if an animal, apparently suffering from colic, has a calculus formed in his intestines, then it is an obstruction, and not colic that he is really suffering from, and recovery then is uncertain; but in ordinary cases of colic, when treated early and treated properly, ninety-nine out of a hundred will recover. Colic sometimes terminates more unfavourably. It is not at all uncommon to find strangulation of the bowels result from colic. If horses suffering from that complaint are allowed to roll and tumble about and do as they think proper, mischief in many forms may take place. A horse suffering from either spasmodic or flatulent colic can be subjected to no better ameliorative treatment than walking (not galloping) him quietly about. It can do no possible harm. Some may say it excites circulation and gives rise to inflammation of the bowels, but is that more likely to do it than for the horse to be rolling and tumbling itself about? He had known great mischief resulting from the latter cause, and had seen three cases where the intestinal mesentery had been twisted completely round, and in such case there is very little hope of recovery. Other bad results also come from the horses rolling and tumbling about. If colic is not treated, and the bowels are allowed to remain in a spasmodic state for some period, inflammatory action sets in, and in nine hundred and ninety-nine cases out of a thousand the result is fatal. If colic be not properly and early treated, there is risk of a condition of bowel taking place which seldom, if in any case, becomes righted—one portion of the intestine can slide into the other, and the result is a permanent obstruction. The bowels are then in a state of inflammation, and the horse is in a state of great suffering. The only remedy in such a case is to cut out the portion of the intestine which is obstructed, and the horse is often saved. The owner of a horse suffering from colic should be perfectly satisfied that

that they knew what the disease was, they had better not attempt to follow out his treatment, as under such circumstances it might do more harm than good. Now supposing they were satisfied a horse was suffering from colic or gripes, they would be justified in administering diffusible stimulants combined with opiates. He would give from 1 to 1½ ounces of sweet spirits of nitre, combined with 1 ounce of tincture of opium. He would give the first with the view of bringing about a diffusion of nervous force, of which they had too much heaped up in the bowels, and would give the latter with a view of alleviating pain, both on the ground of charity and prudence. Supposing they were satisfied they had a case of spasmodic action of the bowels, and were certain it arose from indigestible food, he would advise that the same medicines should be given combined with a bold purgative—he should say aloes. Some would choose oil, but in his mind the safest purgative for a horse was aloes; and, as aloes were often adulterated, care should be taken to get the best Barbadoes aloes. If it was for a cart horse, he would give 6 drachms of aloes in a state of solution, or combined with powder of opium. The dose might seem large, but experience shewed him it was quickly carried off by the kidneys, and that the dose might be repeated in twenty-four hours. He remembered a case in which he gave 36 drachms of aloes in thirty-six hours, and the horse recovered. The aloes was consumed by the kidneys, but in the case of oil it must remain in the intestines till it came out at the anus. Further, the horse should be quietly walked about, as he had already advised. Then supposing, after the administration of the antispasmodic draught in an ordinary case of colic, there was no sign of relief in one or two and-a-half hour, he should not hesitate to repeat the dose, and if, after three hours, there was still no relief, and no symptoms of inflammation setting in, then he should not hesitate to give a dose of purgative medicine. All the while they were treating a case of that kind, they must be on the look-out for

some of those terrible effects which he had said sometimes accompanied or resulted from colic. For instance, where inflammation of the bowels set in, some of the treatment he had been describing would be very bad, and he would not use diffusive stimulants. Again, if the animal was getting cold about the surface of the body, and the attacks instead of remaining intermittent became more continuous, he should be careful of purgative medicine, and then, if ever, bleed the horse, and if he thought it was an attack of inflammation, bleed largely from the jugular vein, or perhaps from both, for the sooner the effect was produced the better. He would bleed till he found the effect in the pulse. The lecturer reminded them that one of the best preventives of all these diseases was to keep the animals regularly fed and treated; that was why the army horses enjoyed such good health. He also advised that they should be watered before fed.

In the course of the discussion, Dr Short-house, who was the principal speaker, contested the efficacy of giving a horse water upon an empty stomach—the result, in his opinion, being that it was absorbed by the veins of the stomach or absorbent vessels, and never passed as water into the small intestines. He defended operations in intersusception, and condemned the use of “enormous machines” in veterinary science. The statement that oil was passed off by the anus he also disputed, holding that it passed into the intestinal canal where it mixed with the food, circulated in it, and passed off with the urine. He denied that colic was a disease, terming it “simply an involuntary spasmodic action of the muscular texture.” Mr J. G. Contrall, another speaker, retaliated upon the Dr, saying that he had never known a case of recovery from intersusception, and denied the existence of the “enormous machines” alluded to.

FOOT-AND-MOUTH DISEASE IN AUSTRALIA.

THE dreadful foot-and-mouth disease, says the Australian correspondent of the *Times*, writing on June 19th, has made its appearance in Victoria. The truth of a rumour that it had broken out among some cattle on a farm at the Werribee, about thirty miles from Melbourne, was ascertained on the 6th inst. by the visit of Mr Vincent, a veterinary surgeon, who had experience of the disease in England. In this country, where flocks and herds roam over wide tracts of unfenced land, and cannot be treated or isolated, it is impossible to over-estimate the dangers of the visitation. Its consequences may be felt beyond Australia, and I forward details, for which space may be given, as of more than local interest. The discovery was at once communicated to the Government, whose inspector, Mr Curr, sent in a report

on the 8th inst., from which I take the following extracts:—

On arriving at the farm I was shown by Mr Cobbledick (the tenant) a young short-horned bull, lately imported, and eleven cows, all of which, with one exception, had, he stated, been suffering lately from some disorder. None of the usual symptoms of ill-health attracted my attention. I have no hesitation in stating that there was nothing about their appearance which would have led any one to suppose that they were or had been suffering from any disorder. As regards these cattle, Mr Cobbledick stated to me that five weeks since he had received from his landlord, Mr Staughton, of Exford station, the young imported bull then before me; that about four days after his arrival on the farm he was noticed to be suffering from a sore mouth so as to be incapable of eating, except when food was forced into his mouth beyond the tip of his tongue, which was somewhat raw; that a week after the arrival of the bull similar symptoms appeared almost simultaneously among ten out of the eleven cows depasturing in the same paddock with him;

that the remaining cow up to the present time had not been affected. He also pointed out that, besides the affection of the gums and tongue, the bull and three of the cows became somewhat lame, dribbled from the mouth, and discharged matter from the nostrils, and that the cows seemed to suffer more than the bull. He further informed me that the attack seemed to last about ten days, and that during that period the milk of the cows was reduced about one-half or more; that they had now recovered their milk, which had been used by his family during the whole period of their illness without any ill effects whatever. During the period at which the disease was most active, Mr Cobbledick stated that the animals ceased to graze, lay down constantly, and discontinued chewing the cud. At this stage they were watered with the bucket and fed by hand, with a little hay and some roots. He was of opinion that had they not been so fed one or two might have died, but that the others did not seem to be in danger. It is also worthy of notice that none of the cows affected slipped their calves. I was further informed that one of the convalescent animals had been put into a paddock with sound cattle some ten days back, from which course no evil consequences seemed to have resulted up to that time; while, as I have already pointed out, one of the cows in the same enclosure as the bull seemed to have escaped infection. From these facts, as far as one may theorize on such limited premises, it would seem that the foot-and-mouth disease is far less virulent in Victoria than in England, as might, I think, have been prognosticated. In addition to the symptoms above enumerated, I must not forget to add that in some cases the jaws of the animals were swollen, and a tremulous motion of the lips was noted during the period when the attack was at its height. The remedies used by Mr Cobbledick while his cattle were ailing, were, as he informed me, a little sulphur rubbed on their gums, and an application of kerosene once or twice to the feet on which they were lame. The sulphur he still applies daily. Besides his cattle, Mr Cobbledick further pointed out to me that three out of twenty-five pigs which fed with the diseased cattle became lame and their feet raw, a circumstance which Mr Vincent attributed to infection. They recovered the use of their feet, having kerosene applied once or twice to the feet. The bull seemed to have been one of six bulls imported from the Northumberland and was kept in summer.

last, by Messrs W. M'Culloch & Co. These cattle were examined in the first instance, on their arrival, by a Mr Rowell, a veterinary surgeon, I believe, of considerable experience respecting foot-and-mouth disease in England, who, I hear, certified to their being free from apparent disease. The cattle were afterwards inspected by Mr J. H. Kerr, and allowed to land, no symptoms of ill-health being visible. From the Northumberland the six bulls and three cows appear to have been removed to a livery-stable in town, where they remained in loose boxes for some time. They were shortly afterwards removed to the country.

We have no definite evidence of the state of the cattle imported by the Northumberland during the voyage.

The only other ascertained instance of the disease having shewn itself is in a small herd of six cows to which an infected bull from Mr Cobbledick's farm was admitted. These animals exhibited the same symptoms as the others, and all recovered. They were in a paddock about nine miles from the farm when first infected, and separated from neighbouring cattle by a wire fence only. At the first opportunity Parliament passed an Act through all its stages in one day, extending the law relating to pleuro-pneumonia to the new malady. A commission of inquiry has also been appointed, which is meeting daily. The preventive measures are,—destruction of infected animals and their remains, penalties on concealing infection, and quarantine for infected districts. Nothing is yet provided as to compensation. No doubt has been expressed as to the character of the disease, but much doubt as to the means by which it was communicated, if not originating in the colony as some suggest. The succulence and abundance of the feed in this winter season is considered a material condition to the mild exhibition of its symptoms, which would be aggravated in summer.

RABIES AND HYDROPHOBIA.*

THE talented author of "Horse-Shoes and Horse-Shoeing," "Animal Plagues," and various standard works, has just issued a magnificent volume on "Rabies and Hydrophobia," which cannot fail to satisfy the desires of all who have had hitherto to deplore the sad want of information on this direful malady.

The history of "Rabies and Hydrophobia" has been traced from remote ages, and by the records thus brought to light no doubt can be entertained that the ancient fathers of medicine were very conversant with the disease as it appeared by inoculation in mankind. Although the existence of "Rabies and Hydrophobia" may have been undoubted, there has been much difference of opinion as to the influence of certain passions as well as external conditions, in which defective observation may have played a conspicuous part. In consequence of this, the origin of "rabies" in the dog has almost in all cases been positively insisted upon as due to contagion alone, the spontaneous origin being passively admitted as a thing impossible. With regard to this the author states, p. 86: "No doubt the transmission of the disease by inoculation, furnishes by far the largest number of cases, and many of these, from the manner in which the inoculation has been effected, appear to be due to other causes than that of a traumatic character; but, notwithstanding, the disease must have had a commencement. Several of the ancient Greek and Roman writers, while admitting the disease was contagious, nevertheless acknowledge that, in the dog at least, it could appear without the contagious element being invoked. Our history shews that while rabies has frequently followed the introduction of European dogs into new regions, it

has also appeared in an epizootic form in countries where it had been previously unknown—as in Peru in 1803—and its appearance could not be traced to any foreign source."

In pursuing the subject as favourable to spontaneous origin in certain instances, Mr Fleming discusses, with no mean ability, the many conditions, which, by modification, severity of operation, &c., are likely to produce influences tending to the production of rabies, and thus chapters on sex, climate, age, hunger, thirst, exposure, &c., successively follow, in which all known researches and investigations are carefully detailed, yet in which the author scrupulously avoids lending himself either to one conclusion or the other. It is plainly evident, therefore, that the object of the writer is to place before the reader that which is actually known on the subject, and by proclaiming a field still open to the ambitious working student, encourage him to take up the task and pursue it towards completion.

But the value of the work is far beyond the mere records it professes to give. Copious chapters are added on the nature and symptoms, &c., of hydrophobia in man, and many other animals besides the dog, and well-executed coloured plates accompany the text, which convey an excellent idea of the ravages which the disease causes in the system. Besides being a work suitable to the veterinarian and medical man, the legislator will find much that is useful in aiding him to propound a solution of the question of dealing with the dogs of our country, as a subject of paramount importance to the safety of Her Majesty's subjects; and every lover of the dog will find in Mr Fleming's work matter which must ever form standard information on the proper management of that faithful companion. Numerous well-executed woodcuts also embellish the work, and the *tout ensemble* is altogether worthy of the well-known publishers.

*Rabies and Hydrophobia: Their History, Nature, Causes, Symptoms, and Prevention. By George Fleming, M.R.C.V.S., F.R.C.S., M.A.J. and C., pp. 405. London: Chapman & Hall.

ge yield from this breed. For table uses they cannot be much considered, to their small size. The first thing to be considered by those who keep fowls should obtain that breed most suited to the use of the locality as well as the accommodation and convenience of the individual poultry keeper. To the farmer who possesses an unlimited grass run, with farmstead sheltered and soil dry, the Houdan or the Dorking would be found the most generally useful and profitable breed to keep. The cottager who is obliged to confine his fowls within a narrow space the Brahma or the Cœur will probably be found the most suitable and satisfactory, combining egg-laying power and flesh-forming propensity in the same bird, and less likely to suffer by confinement than any other bird, as they are found to thrive in a space where Houdans, Dorkings, or Hamburgs would pine and die.

PROFITABLE MANAGEMENT.

There are certain rules that must be practised to make fowls profitable. The first is to keep your stock young, and clear off your stock at that age at which they leave the nest at first profit. Secondly, to hatch your fowls as early in the spring as possible, to give them advantage of the entire year, to hasten them to lay in maturity, so obtain as early a supply of eggs as possible, and at a season when they command the highest price. Thirdly, to keep a breed of fowls that is hardy and comes early to maturity, easily fattened for the table, and a voracious and prolific egg-layer. Fourthly, to provide comfortable housing, together with a regular supply of sufficient food to keep them in good condition. Now I think that most poultry-keepers will agree with me when I say that the observance of these essential rules is the exception and not the rule among the general run of poultry-keepers. I will illustrate the profitable management of a poultry-yard by describing that which is practised, at an imaginary model farm, where the fowls are kept as they should be, and are found to return a clear annual profit averaging 10s. to 12s. per bird, or a total annual

profit of £37 from sixty laying hens, and an equal number of fatted chickens. I visit this farm early in November, and I find a fine healthy stock of Brahma, Dorkings, Houdans, and silver-spangled Hamburgs. I am taken to the hen-house, which I find to be a simple structure, built in a sheltered situation facing south-east. The building is perfectly dry and free from damp, airy, well-ventilated at the top, and rather light. At the time I visit the yard, the pullets hatched during the past March are commencing to lay, to replace the older hens hatched the year previous; and after they have done laying, which are now being fattened and killed off at the age of nineteen months, these pullets continue to lay off and on through the coming winter and following summer, laying an average of 180 eggs per bird between this time and the following autumn, at which time they in their turn are killed off to make room for that year's succession of pullets then commencing to lay. These eggs, one-half of which are produced during the winter months, and fetch 15d. per dozen, and in the summer 9d. per dozen, realize a total of 15s. per bird, and each one fatted and disposed of in autumn at the age of nineteen months will realize 2s. at 4d. per lb., their average weight exceeding 6 lb. This gives a total of 17s. as the return from each laying hen killed at the age of nineteen months, exclusive of the value of their manure made during the time. Some fowls are allowed to live another year, and are killed twelve months later, as these older birds make the best brood mothers, and lay an increased number of eggs the second summer; and in cases where poultry keepers are unsuccessful in rearing chickens, and have not the necessary accommodation for doing this, they will find it to their advantage to kill off their hens at the close of their second laying season instead of the first.

THE SYSTEM OF FEEDING.

The system of feeding practised at this farm is as follows:—The fowls leave their roost at the first rising of the sun, and are out and about for two hours picking up the early worms, &c.; at 8 o'clock they get their

morning meal, which consists of a mess of meal mixed to the consistency of a stiff dough, $1\frac{1}{2}$ ounces being allowed to each bird. This meal is continually varied, one time oatmeal, another barley meal or Indian Corn meal, or brank or buckwheat meal, and a small quantity of bran being mixed through it; this is thrown to them on some clean spot, each fowl being allowed as much as it will peck up greedily. Mid-day they get a small allowance of boiled potatoes, parsnips, carrots, or mangolds hot, with a little bran and chandlers' graves or other stimulating substance mixed through it; and at 4 o'clock, before retiring to roost, they are supplied with whole grain at the rate of $1\frac{1}{4}$ ounces to each bird, a change in the variety given being made twice-a-week. The cost of the feeding I have described throughout the year averages $1\frac{1}{4}$ d. to $1\frac{1}{2}$ d. per week per bird, taking the price of grain at 1d. per lb.—a fair average price—and this feeding is found to keep the stock in the highest possible state of health and profit. Five or six broods of chickens are hatched every March to replace the hens killed off each autumn, and so a succession of young and profitable birds is being continually kept up. A little dry mould or earth is sprinkled twice a-week over the droppings of the fowls in the hen-house, to deodorise their excrement, fix the ammonia, and keep the house sweet, and so render the manure as valuable as possible, and obviate the necessity of continually cleaning the house. Two or three broods of chickens are reared for market purposes during the months of March, April, May, and June, of either the Houdan or Brahma Dorking breed. The chickens are forced on by liberal feeding and continual change of food, so as to get them ready for market as soon as possible. The chickens are usually fit to kill at the age of eleven or twelve weeks. During this three months they are estimated to consume food to the value of about 1s. 5d., besides what they gather for themselves, at which age they weigh from $4\frac{1}{2}$ lb. to 5 lb., and realize 3s. 6d. each, leaving a profit of about 2s. on each chicken. The casualties that arise from the death of

chickens are found to be very trifling. To sum up the total receipts and expenditure of this lot of fowls it will be found as follows. On the debtor side we have—

| <i>Dr.</i> | <i>s. d.</i> |
|---|--------------|
| Cost of rearing and feeding 90 laying hens to the age of nineteen months, at the rate of $1\frac{1}{4}$ d. per week for grown birds, and half amount during chickenhood | each 6 8 |

Well, on the credit side we have—

| <i>Cr.</i> | <i>s. d.</i> |
|--|--------------|
| 15 dozen eggs at an average price of 1s. per dozen, <i>i.e.</i> , 9d. in summer and 15d. in winter, will realize | 15 0 |
| Value of fowl when killed in the autumn at 4d. per lb.—say | 2 0 |
| | 17 0 |

Now deduct the above cost for rearing and keep during the nineteen months (6s. 8d.) from the 17s., and we have a balance of 10s. 4d., a clear annual profit from each laying hen, and as I shewed before a profit of 2s. in three months from each chicken reared for market, will thus give :—

| | |
|------------------------------------|---------|
| 60 hens at 10s. 4d. | £31 0 0 |
| 60 chickens reared for market..... | 6 0 0 |
| | £37 0 0 |

POULTRY AS FARM STOCK.

It will be asked upon what grounds fowls can be supposed to realize a larger profit than other animals? The answer is a simple one. In the first place fowls obtain at least one-half their living at no cost whatever to their owner upon what may be called waste food, such as worms, slugs, flies, beetles, grubs, grass seeds, waste corn, and vegetable food, all of which they gather for themselves, at no cost to their owner; whereas cattle, sheep, pigs, &c., depend wholly upon food purchased or raised specially for their use. Again, the average price realized in the carcase of beef and mutton is only 4d. or 5d. per lb., whereas the price of fowl meat is at least 9d. or 10d., although produced at a much less cost; and, again the profit realized by the eggs produced in proportion to the food consumed is far greater than that realized by producing meat.

The Naturalist.

GROUSE SHOOTING AND PIGEON SHOOTING.

WE quote the following from the *Pall Mall Gazette* on the above subject as being neither maudlin nor morbid, sentimental nor savage, but as taking a very sensible view of the whole matter :—

Without going into the question as to whether or not it is gross and wanton cruelty to shoot pigeons from a trap, on the approach of the twelfth, it may not be uninteresting to regard the sports of Hurlingham and Shepherd's Bush from another point of view. The advocates of pigeon shooting have upheld their pastime upon many grounds, but upon none more strenuously than that it was an admirable preparation for those performances on the heather with guns with which no one apparently finds fault or objection. It is said by the advocates of bird handicaps that a "difficult" pigeon is as hard to bring down as anything in the shape of game. The number of the traps impart the requisite uncertainty to the feat. The various ways in which the dove tries to escape his fate is another element contributing to render the business like real game shooting. But there are some hard facts to be brought against these representations ; and one of the most important is, that while a good game shot—a good general shot at grouse or whatever gets up—may be able to hold his own at Hurlingham, it is seldom, indeed, that a confirmed artist and practitioner at the trap distinguishes himself on the moors or at the coverts.

The flight of a pigeon from a trap assuredly in no manner whatever resembles the start of grouse from the heather. In grouse shooting there is always a large measure of ground, indeed, from any part of which the birds may spring. The dogs never absolutely let you

know the exact spot within a few yards from which the pack or the single bird may fly. It is possible that when you have dispersed broods, and they have dropped in different places, by close marking you can ascertain pretty nearly where they are ; but they may run, and when your eye is fixed on a particular bunch of cover or by the side of a white stone, when from the attitude and conduct of your four-footed assistants you are almost convinced the birds *must* be just before you—whirr—they are off entirely to the left, or perhaps have gone round you altogether. Nothing whatever analogous to this occurs opposite the pigeon traps. To be sure, the pigeon may be loosed from one trap or another, but you know perfectly well that he must hop or dart from enclosures only altogether extending across so short a space that it can be steadily swept backwards and forwards by the shooter. The very pigeon-attitude of ready shews at once how erroneous it is to compare shooting in the field or on the moors with shooting at bagged birds in a paddock. A gentleman who on the twelfth attempted to march through the heather with his gun constantly on the present would be a just object of ridicule to the humblest gillie retainer of the gamekeeper.

Again, there is nothing in game shooting that better serves a sportsman than coolness or nerve. Now, although it has never yet been known or recorded that a pack of grouse have turned on a fowler and attacked him, it is extraordinary what excitement attends the approach to them when that approach is intensely and emphatically indicated by the dogs. If they were so many tigers in the jungle, they could not cause greater heart-beating than they do to

a person quite capable perhaps of standing fire without blinking. This feeling is very difficult either to analyze or to describe, but it positively constitutes one of the special enjoyments of sport. The feeling of relief when the birds do get up and yet behave creditably in accordance with the opportunity presented to you, is one of the most agreeable sensations imaginable. It is experienced perhaps more forcibly on the twelfth than later, but it always accompanies sports. That it does not accompany the butchery of the battue is a proof that that fashion of killing game is little more exciting than the custom of cutting the throats of domestic fowls with a carver is felt to be exciting by the cook. But what corresponds to this feeling in pigeon shooting? The nerves are tested in quite a different fashion at pigeon matches to that in which they are on the moors. You are engaged in a game of mingled chance and skill; you are shooting for stakes more or less heavy, for private bets. These things, to be sure, may throw your hand out a little. Besides, there may be money laid on you; you have a reputation to keep up or to make. People do not go to the moors to wager on their work. They are not distracted when a bird is fleshed at the thought that if he is missed he flies off with twenty bank-notes, so to speak, belonging to them. Their trepidation, if the word can be used, is in the latter instance altogether of a pleasurable kind. The nerve of the pigeon shooter will not serve him much in the heather. He is used to an audience, to spectators, to a crowd. He finds few or none on the moors. He has no time to adjust himself to his old slaughtering position when the gun and rust of the strong wings startle him. The keeper would not permit him to do so, and he would not permit him to do so. He might be highly successful in the heather, but he is, in the moor, almost as much of a bag of birds as a basket of water. Or he

contrary, a good game shot very soon gets into the knack of pigeon shooting if he can only overcome the feeling about shooting almost on a stage. He is at first liable to be too fast or too slow, not knowing the flying habits of the so-called blue-cock, which the experts learn soon enough. But he does not discover, after a season at the traps, that he can exceed his old average on the moors. He shoots neither better nor worse at the grouse than he did before he took to joining the dove tournaments. It is then plain enough that the recreation, or whatever it may be called, of pigeon shooting cannot claim an alliance even of a distant sort with grouse shooting. If we come to other game—snipe or woodcock, for example—the separation between pigeon shooting and wild-fowl shooting becomes absolutely so great that there is nothing in common between the two but powder and shot. It may be noted here that the very guns employed at the pigeon matches are not the guns that men will use by choice at the moors. The muzzle-loaders will not be so favoured, we expect, as weapons against the grouse as they are as weapons against the pigeons; this, however, may be from reasons unconnected with our special point. Learning to shoot game by learning to shoot pigeons is like trying to acquire the art of swimming by practising it in a feather bed. You may learn to shoot pigeons as you may the useful art of simulating natation, but when the grouse get up before you you are almost as helpless on the moor with your knowledge of traps as you would be in the sea without being able to keep afloat. Swallows and martins are better practice for game shooting than pigeons, not that they either will be found of much advantage as preparatory for grouse or partridge. An honest novice on the hill-side and the moor is the best training a sportsman can possibly have. He must, perhaps, necessarily put past him so many misses, but we must all pay for experience in everything; and, without dwelling on the point, it may be finally observed that experience, such as is to be derived from membership in a gun club, is, perhaps, less economical than what may be servicably had in a far more wholesome and efficient manner.

THE FRIENDS AND FOES OF THE FARMER.

AT the last meeting of the Framlington Farmers' Club, the Rev. E. A. Bloomfield, of Guestling, delivered a lecture upon "The Friends and Foes of the Farm and Garden." Rats and mice he considered as mitigated evils; and moles, where there are drains, were certainly injurious. Referring to birds and insects, Mr Bloomfield proceeded as follows:—Let us now turn to the birds, and here we find many friends of the farmer, although he too often looks upon them as foes. Kestrel, or windhover.—I could wish to say a word in favour of this pretty hawk. Its food consists almost entirely of mice and insects; and while it thus does great good to the farmer, I believe it does no harm to game, and ought to be encouraged by game-preservers as well as farmers. In fact it is often confounded with the arrow-hawk, and thus suffers for the sparrowhawk's misdeeds. Barn owls are still greater enemies of the farmers, destroying numbers of mice and insect foes; and as they are out at night only, need not be suspected of injuring game. I believe that the good the rooks do to the farmer is incalculably greater than the injury. The truth is, we can easily see the harm they do, while we cannot see the thousands of subterranean grubs which they devour. For instance, you will see a flock of rooks pulling up the grass in pasture. What are they doing? They are devouring the destructive grubs which live at the roots of the grass. Although the rook may do harm to the corn when first green and when ripe, it far more than repays the farmer by destroying the insect enemies throughout the year. Besides, it is easy to keep the rook off the crops for a few months, and have the benefit of its services at other times. The raven is also most useful in destroying insects, especially the grubs, which live at the roots of the grass. They have, I know, been accused of sucking pigeons' eggs; but I

believe the charge to be groundless. There are three kinds of pigeons which occur with us, the ring dove, the stock dove, and the turtle dove. The turtle dove is only with us in the summer, and does little or no damage. I cannot say the same for the other two. In this neighbourhood, I believe almost everyone knows the difference between them, but in many parts of England the differences do not seem to be recognised. The ring dove is much larger and of lighter colour, and builds a rude nest in branches. The stock dove is more like our common blue rock domestic pigeon, and generally builds in hollow trees. I am afraid I cannot say a good word for the ring doves, as they are very destructive, especially to peas and young clovers, while they do very little good in return. They are almost exclusively vegetable feeders, and do not destroy wire-worms and grubs, as the rooks do. I know that sparrows are detested by the farmer; but I believe they are not an unmitigated evil. They destroy many grubs, which would increase amazingly if they were allowed to go unchecked. I cannot leave the birds without saying one word in favour of the woodpecker. It does neither harm nor good to the farmer, but I believe is often considered as an enemy by timber growers. I believe it is, on the contrary, a good friend to them. It destroys many of the insects which injure trees, and never, I believe, bores into sound trees—in fact, a woodpecker's hole is a sign that the trees ought to come down.

As to our insect friends and foes, the cockchafer is very destructive to the leaves of shrubs and trees; but the damage it does is of little consequence compared with that done by the larva or grub, which lives at the root of the plant. "Many a fair pasture land," we are told, "is withered, and many a broad field of corn assumes a sickly appearance" through these destructive creatures.

may be easily found in the dust. Sometimes the damage done is very considerable. One observer, Mr Kirby, a Suffolk man, by the way, calculated that the loss through the midge in one field he examined was not less than $1\frac{1}{2}$ bushels per acre. Others have put the destruction much higher. Probably the best method the farmer could use where the midge is common, would be to burn the dust

after thrashing. Fortunately, both in the case of the midge and of many other of our insect scourges, there is a check provided far more effective than any we can use. There are small flies called ichneumon flies who deposit their eggs in the maggots of the midge, and thus destroy them, and this is one of the most effectual ways of limiting their increase.

AMERICAN BLACK BASS.

MR FRANCIS FRANCIS writes as follows to the *Times*:—I have just received intelligence from Mr Barnaby, of the Troutdale pisciculture establishment at Keswick, of his return from America with a stock of black bass fry, which his partner, Mr Armistead, writes to say are safely deposited in their tanks, and are now feeding heartily, so that if no accident happens, they may happily be reared. Unfortunately, owing to the unfavourable weather and the difficulty of obtaining the fry in America, and also to the loss of a good many even after they reached Liverpool, the stock is but a small one, only sixty being left alive; but these, if they do well, and take to the water they are placed in, may breed and become the parents of a large stock; and in order that his trouble and expense may not be thrown away, Mr Barnaby is contemplating another journey immediately to add to the stock.

There are two species of fish called black bass in America: the lake fish of the north (*Crystes nigricans*), the object of Mr Barnaby's journey, and the bass of the south and west (*Crystes salmoides*). Anglers will be glad to hear that the new fish, which somewhat resembles the perch in form, is an excellent sporting fish, and takes both fly and spinning bait readily, and gourmands will be pleased to learn that it is an admirable fish for the table. The introduction of a new fish—and so good and useful a one—I think deserves to be chronicled as the second greatest feat in pisciculture ever accomplished—the introduction of salmon into Australia by Mr Youl being the first—and it is a satisfaction to know that, though the art receives no encouragement whatever from our Government (as it does in other countries), yet both these feats have been undertaken by Englishmen.

way with silent and measured step. And need we wonder at it in these our times when we read of the Hellenic race symbolizing their language by the flowers of the period. Nor are they alone in this, for we have the Chinese, long before other nations, "communicating ideas by means of florographic signs." And going back to Eden, were not there fruits and flowers of every kind to captivate and charm? and we all know how enticing the beautiful Apples in the middle of the garden were; and as to flowers, as one writer puts it—

Flowers! the sole luxury that Nature knew
In Eden's pure and guiltless garden.

But we are discoursing, or intended to discourse upon Window Gardening, and while doing so let us remind our readers that the best sort of window gardening in summer is that of the decoration of the window out-of-doors. There is less of this in winter, although even in winter's gloom a bright coloured bulbous plant may be made to peer out of the darkness of the green of the climber, and give light and life, and good cheer to the troubled and anxious and thoughtful mind. But as the sombre dresses of winter are laid aside, and the light and airy and graceful styles of summer come again upon us, so do the variety and brightness of the colours of flowers. We cannot have the blaze of floral beauty out-of-doors in winter, no more than can we have those showy and beautiful costumes that make beautiful woman even more beautiful still. We must exchange our tender Pelargoniums, and Verbenas and Calceolarias, and Lobelias and Fuchsias, and many other things, for the hardier, less vivid-coloured denizens of more northern climes. We may wreath the Ivy, or train the naked-stemmed Jessamine about our verandahs; we may have the Christmas Rose, or the Snowdrop, or the Crocus peering out from a box of dull earth to enliven the window, but our best efforts fall far short of summer's beauteous flowers—they differ, indeed, as much as the summer from the winter day. There is a dullness and coldness about them which it is not in the power of man to change; but still, withal, they are in-

teresting. To keep the interest awake, and to charm the lover of nature, flowers at that time must be selected and kept for the interior of the window. And our readers have seen, by portrayal, and heard by the mouths of our correspondents, how beautiful even a window may be in the dull cold days of winter.

We said that the suburbs of London teemed with a beauteous display of flowers—window flowers, too. And of what were they composed? That is the point on which we mean to say something, to shew what, in our opinion, is in good taste, and, by inference, what is not. Possibly the neatest dressed cottage window we saw was in one of the houses along the green lanes in one of the many roads from London to Cheshunt. Round the window had been led a *Wistaria sinensis*, which, in its season of flower, would be something very attractive for the passers-by. Later on in the season, it displays its foliage to great advantage, and distinct glaucous handsome foliage it has. That foliage partly covered the box-like ledge, formed for keeping the earth for plant feeding within the window-sill. Springing over the box edge, was some variegated Ivy, and on its margin rested masses of blue *Lobelia*. In the centre of the box stood upright a *Humea*, with its spray-like inflorescence, not very fully developed, nor yet of very important cultivation, but sufficient to give character to the simple flowers that flanked it on either side. Then came a *Madame Lemoine Pelargonium*, with its trusses of flowers so decidedly beautiful that we never saw it in greenhouse or window at all in comparison with this of the humble cottage. We noted it particularly, and prized it since, as one of the *Pelargoniums* of the million, for softness of colouring, for size of truss, and for general effect of inflorescence. Again, there was a yellow *Calceolaria*, we think, of the *Kayii* breed, which variety, by the way, seems to do better about London than any of its compeers—a *Fuchsia* springing, as it were, out of its midst, and modifying that glaring colour, toning it down, as it ought to be done, and stamping the window-sill as if it had been designed by the

hands of one of the most accomplished artists in the arrangement of flowers. Some Verbenas seemed to be coming into flower, and other things which in the driving past we could not make accurate notes upon—all, however, shewing that the window was one of telling effect, commanding the attention of every passer-by, and affording the greatest satisfaction to the humble inmates.

There were a number of others much less satisfactory in their effects. The idea with many was to have as great a crowd of flowers as possible, and where that idea prevailed, it resulted in an exhibition of bad taste. Simple flowers can be made to look highly interesting; indeed, the one set enhances the appearance and character of the others when properly arranged and properly blended. We cannot look for a finished result in all cases, neither shall we expect to get it, even supposing window-gardening were much more general than it is, but we praise every attempt, and we would desire to give every encouragement to the tyro and the flower-loving aspirant. See, we would say to all, that an assortment of flowering plants, be made to contrast, and shade, it may be, with plants of beautiful foliage, and as the trials go on so will the desire for a better acquaintance with plants; and a better taste in arranging them will naturally follow.

The first thing that should be studied is an acquaintance with the habit and colours of the plants intended for cultivation. Once this is gained, then the task is no task at all, but a pleasure of the most exquisite kind. We have all our degrees of pleasure and of pain to which we be all to submit to the processes and to the results of the sub-

some more cheerfully than others. We also have all our degrees of joy and happiness. The beauty of the study of flowers is, inasmuch as it not only tends to make us when happy more happy still, but when in sadness, to offer or open up rays of cheering reflection. And when we see our fellow-men that toil hard with their busy hands all day, come home to a happy household, and after the evening meal go out and enjoy the balmy summer evening all the more that the flowers which he or she, or both, have nursed, mingle their perfume with the evening gale, there seems a consummation of happiness and pleasure that is really of itself worth living for. Let us cheer, therefore, every individual, in the exercise of a little spare time to go onwards, not only doing window gardening himself or herself, but encouraging others to do so as well. There would possibly be a better outcome from this practical way of teaching the people to look into and learn from the great book of Nature that is continually spread before the eye. There is nothing wearisome, nothing altogether monotonous in Nature's works; every day brings with it some new features, and if there be one study more than another that will draw the hardened heart to a longing desire for worshipping the God of nature, it will be those beautiful children of the Earth that smile so pleasantly upon every passer by.

From the elevated position of the window sill, an effect can be produced of a much more striking character than any example of similar extent of ground gardening; and this being so, we expect to see large numbers following the good example of the suburban City gardeners.

GLASS CASES FOR FERNS.

WHEN our correspondent, M. A., asked us some time ago to give some idea how glass cases should be furnished, we were so engaged that we had not time personally to attend to her query. Even now we can do little more than give her some idea how these things may be cultivated, and how they may also be contrasted with other associates that have equal claims upon general attention. Mr Williams, in his work on Ferns, gives

Here the case is composed of a *Dracæna* for a centre plant, surrounded by Ferns, which, with their broad extending forms, give grace to the whole arrangement. Interspersed among these Ferns, which may be of any of the selected sorts named by Mr Williams in his article upon that subject; or better still, if that were possible, by Vive Vale, who writes upon a "Half Century of Ferns for Drawing-room Decoration" (vol. xviii.



Glass Case for Growing Ferns.

capital suggestions upon general cultivation, general selection, and cultural details. In the meantime we must refer our fair correspondent particularly to that work.

Now, let us say that a glass case, after the style of our engraving, will meet all that our correspondent desires. These cases, we understand, are to be bought in London in various houses, and the plants can be had from any of our leading nurserymen.

page 758)—interspersed among these Ferns, we say, place an *Alocasia Lowii* or *A. Veitchii*, which stand confinement without permanent injury; and you will have a lot of forms and features that will render your case very captivating. It will be all the more admired that it has the more variety, and we cannot do better than ask you to take a lesson from the glass case for growing Ferns represented in the above engraving.

IF there is one aspect of London gardening that may be appropriately termed badly done, as a general rule, it is that of outside window boxes. Hundreds of attempts are made at window gardening annually within the metropolitan districts, and yet but few of them can be said to be successes. This arises from—first, unsuitability of the plants employed ; and, second, neglect. It is not unusual to see early in March, when cold northerly or easterly blasts prevail, window-boxes filled with tender plants from a warm house, such as Cinerarias, Primulas, and similar things, that in a day or two become shrivelled and browned. This is often attributed to want of water, and a copious supply being given soon completes the work of destruction. On the other hand, many a box of plants fully exposed to scorching sunshine and the drying effects of east wind, soon presents a starved appearance for want of water. There are, however, many exceptions, where a genuine love for plants causes them to be tenderly watched, and their wants supplied. Under such circumstances, they are a constant source of gratification.

—only a few of each ; with these I mingled a few roots of mixed Turban Ranunculus, covered the whole with soil, and then, by way of a finish, I planted along the front of the box some tufts of the pretty new Leptosiphon roseus. From the early days of February, when the Snowdrops and Early Crocuses come into bloom, and on down to the present time, when the gay flowers of the Ranunculuses are fading away, and the tufts of the Leptosiphon are in full splendour, there has been one uninterrupted sequence of floral beauty. The Crocuses and Snowdrops died away gradually ; but after the Hyacinths and Narcissus were out of bloom, I cut them down nearly to the surface, in order that the fast developing Ranunculuses might have ample space. While the bright, hot, dry weather lasted, I water copiously every day, though the soil in the box is so honeycombed by the number of roots it contains, that it passes through it very quickly.

In a few days the contents of the box will be turned out, and all the bulbs, with some soil adhering to their roots, will be carefully put away in paper bags, for use in the same way next autumn. They will answer well two years in succession. Then the box being filled with fresh soil, will be again planted, with a few foliaged and flowering plants. Over the front of it will fall the variegated form of *Sedum Sieboldi*, variegated Ivy-leaved Pelargoniums, and the pretty pale lavender-flowered *Penstemon mauritanicus*. A plant or two of the blue-blooming *Tropæolum Lobbianum*, and a black variegated Pelargonium, and a single *Impatiens*, will complete the arrangement. In the end of October; and when they are in flower, another season for planting will be over and come round again.

the window garden is always attractive; and these are inexpensive modes of embellish-

ment are capable of much variation. There are always procurable many subjects, hardy and durable, that can be employed to serve such a purpose as this during the winter and spring months. I have used *Iberis coriæfolia* in this box, for instance, with surprising effect; early-blooming Pansies, double Daisies, Phloxes verna, Frondosa, and Nelsoni, and many others, of which these are fitting types, may also be employed. A few dwarf evergreens can be used during winter and

early spring, to be succeeded by flowering and foliaged plants for summer and autumn. Only let there be the desire to do something, and means will be found close at hand to effect the object in view. In the grandeur of our conceptions of horticultural enterprize, and in the lofty ideas of gardening prevalent now-a-days, we are apt to lose sight of the value of simple things, which, though unpretentious, are often highly praiseworthy and effective.—*Quo in the Garden.*

SOMETHING ABOUT PICKLES.

PICKLES, as an article of food, are to the best stomachs only appetizing, and to the weakest positively injurious. Still people will eat pickles, and whatever our "physiological" friends may say, we do not doubt that things so generally craved have some use in the animal economy. When soldiers have chronic diarrhoea, our army surgeons usually allow them to eat pickles and other things, that, under ordinary circumstances, would be considered fatal, and to the surprise of everybody the hopeless patients often recover. So, without discussing the dietetics of the matter, we accept pickles as a fact. To look at the matter physiologically, a pickle is a mere vegetable sponge to hold vinegar. Any vegetable tissue that is not so fibrous or tough as to be unpleasant to masticate, and which has no disagreeable flavour of its own, will answer for pickling. If the article pickled has an acceptable flavour of its own, all the better. It is the possession of this that makes the Cucumber the most popular of all pickles. Vegetables which have no marked taste are made flavoured by the free use of spices. It is customary to salt pickles before putting them into the vinegar. Why do we?—It is not for the purpose of flavouring them with salt, for this can be added to the vinegar. This matter of salting pickles brings us to the question of *osmose*, which we cannot find space to discuss.

Briefly, when a fresh vegetable is placed in salt and water, an interchange takes place between the juices contained in the tissues of the vegetable and the brine by which it is surrounded. The natural juices pass out and the brine passes into the vegetable; the brine being denser, it, according to a well-known law, passes in more slowly than the juices of the vegetable pass out, and the salted things shrivel. When salted pickles are placed in water the case is reversed; their shrivelled tissues are full of brine, much heavier than the water by which they are surrounded, the brine passes out, and the water goes in and restores the plumpness. Soaked pickles with their tissues full of water being put into vinegar readily become penetrated by that liquid. The question of salting pickles has nothing to do with flavour, as the finest pickles are those from which the salt is most completely soaked.

One of the most frequent questions is, "How can I make pickles like those put up at the makers?" This may be answered, that the pickles referred to are put up in colourless vinegar. Home-made pickles should be prepared with regard to flavour rather than appearance. As a general rule, vegetables to be pickled are first put into brine, then soaked to freshen them, and then placed in vinegar, which may be spiced or not, according to taste. One point is to be

noticed: when freshened pickles are put into not very strong vinegar, the water with which their tissues are filled so weakens the vinegar that the pickles are not only not sour enough to the taste, but not enough so as to keep well. It is not necessary to enumerate the things that may be pickled, as there are few fruits or vegetables that may not be so treated—pickled Peaches are delicious and pickled Purslane is not to be despised—a wide range surely. Some good housekeepers have, besides the regular Cucumber and other standard pickles, a jar of—

Mixed or Indian Pickle.—The basis of this is usually sliced Cabbage, and Cauliflower broken into bits and put into brine. After these are ready, they are covered with spiced vinegar; and then such pickle materials, fruits, or vegetables as occur during the season, are added from time to time, taking care that the newly added things are covered by the vinegar. At the close of the season the vinegar is drained off, heated to the boiling point, and poured over the pickles; this is repeated two or three times, when the pickles are stored away for use, and are usually better in the second year than the first.

In the making of the spiced vinegar, probably no two will agree. As a suggestion we give two recipes. The various directions differ greatly, the chief object seems to be to get in enough spice. In looking them over, we are reminded of the toper's directions for making punch, "too much of lemons, sugar and whisky, and not enough water."—One recipe gives: Vinegar, 6 pints; salt, $\frac{1}{2}$ lb.; bruised ginger root and whole mustard seed, 2 oz. each; mace, 1 oz.; shallots, $\frac{1}{2}$ lb.; Cayenne pepper, a dessert spoonful, and some sliced horseradish. Simmer together for a few minutes, then put into a jar and cover close. Another, claimed to be "very superior," directs for each gallon of vinegar 6 cloves of garlic, 12 shallots, 2 sticks of sliced horseradish, 4 oz. bruised ginger, 2 oz. whole black pepper, 1 oz. allspice, 12 cloves, $\frac{1}{4}$ oz. Cayenne pepper, 2 oz. mustard seed, $\frac{1}{4}$ lb. mustard (ground) and 1 oz. turmeric. All the above, except the mustard and turmeric, are put into the jar with Cabbage, Cauliflower, and other pickle vegetables, and the vinegar boiled and poured over them. The ground mustard and turmeric are to be made into a paste, with cold vinegar added.

THE COUNTRY GENTLEMAN'S MAGAZINE

OCTOBER 1872

THE AGRICULTURAL LABOURER IN THE SEVENTEENTH CENTURY.

IN his "History of England," Lord Macaulay gives an exceedingly interesting account of the wages and condition of the English agricultural labourer two hundred years ago ; and as we have not yet seen it reproduced, and think it will be a valuable contribution to the agitation which has lately taken place among the rural population, we have transcribed it. Of course there are many circumstances—the mere distance of time being the principal—which make the account obsolete ; but as a faithful picture of the condition of the agricultural labouring population in the seventeenth century it is worthy of careful perusal :—

"The great criterion of the state of the common people is the amount of their wages ; and as four-fifths of the common people were, in the seventeenth century, employed in agriculture, it is especially important to ascertain what were then the wages of agricultural industry. On this subject we have means of arriving at conclusions sufficiently exact for our purpose.

"Sir William Petty, whose mere assertion carries great weight, informs us that a labourer was by no means in the lowest state who received for a day's work 4d. with food, or 8d. without food. 4s. a week, therefore, were, according to Petty's calculation, fair agricultural wages.

"That this calculation was not remote from the truth we have abundant proof. About the beginning of the year 1685, the

justices of Warwickshire, in the exercise of a power entrusted to them by an Act of Elizabeth, fixed, at their quarter sessions, a scale of wages for the county, and notified that every employer who gave more than the authorized sum, and every working man who received more, would be liable to punishment. The wages of the common agricultural labourer, from March to September, were fixed at the precise amount mentioned by Petty, namely, 4s. a-week, without food. From September to March the wages were to be only 3s. 6d. a-week.

"But in that age, as in ours, the earnings of the peasant were very different in different parts of the kingdom. The wages of Warwickshire were probably about the average, and those of the counties near the Scottish border below it ; but there were more favoured districts. In the same year, 1685, a gentleman of Devonshire, named Richard Dunning, published a small tract, in which he described the condition of the poor in that county. That he understood his subject well it is impossible to doubt ; for a few months later his work was reprinted, and was, by the magistrates assembled in quarter sessions at Exeter, strongly recommended to the attention of all parochial officers. According to him, the wages of the Devonshire peasant were, without food, about 5s. a-week.

"Still better was the condition of the labourer in the neighbourhood of Bury St Edmunds. The magistrates of Suffolk met

say that Mr Brand has anticipated and satisfactorily answered them.

Not a few masters, eager for the improvement of the lot of their men, have thought of this solution; but the attempt has not been invariably successful. The amount invested by the men proved small. The increase in the book-keeping was large. The labourer's dividend was too trifling to exercise any influence on his lot or on his conduct. The employer had enough of capital of his own; he did not want the men's groats. He did not want the bother and responsibility, appertaining to these tiny sums, thrown on his shoulders. He did not wish to give the slightest pretext for interference. And, on such terms as Mr Brand, in the great goodness of his heart, offers, it would seem to many impossible to work. It is plain that he offers his labourers the advantage of his skill as a farmer, whatever that may be, all for nothing. He is to have all the risk, they the certainty of profit. Such a plan is therefore, eleemosynary in essence.

Again, if there be any fetter against rise in wages, it may seem rather ridiculous to tell the agricultural labourers that if they save, they may hope to become *commanditaires*, and to rise above their present position. Mr Brand does not despair of his labourers saving 2s. a-week out of wages of, say, 12s. a-week. How that is to be done in these dear times we do not know; and even were a labourer to scrape together £20, a most improbable contingency, the regular payment of a dividend of 5 per cent., another most improbable contingency, would add to his earnings only about 1s. a-week. We must therefore be content to see the men's savings

fashion is the immediately interesting problem, may be elsewhere practicable. When we look to the wages of certain skilled mechanics—say bricklayers, earning 34s. a week; forgemen, 32s. to 36s.; moulders, 36s. to 40s.; shipwrights, 36. to 42s. for instance—we see that they have available a fair margin for saving. With them the accumulation of a small fund is not a hopeless ambition. To talk to them of economizing is not cruel mockery. They might, conjointly, put together a large amount of capital. At present, however, the modes of investment open to them are not very numerous or attractive. There are their benefit societies, the unremunerativeness, not to say the insolvency of most of which, is notorious. There are building societies, whereby a man may purchase, in course of time, his house, and the advantages offered by which vary indefinitely. Then, too, there are the savings' banks, both the trustees and the Post-office. In the former, it would appear from the last returns, that there were thirty-nine millions sterling deposited, and in the latter, eighteen millions. The rate of interest is small; and we cannot help thinking that there is a lamentable lack of more suitable channels of investment for the artisans possessed of high wages. The true savings' bank ought to be one's own profession, and if some one could only show how artisans earning over 30s. a-week could be induced to put their savings into the business with which they are best acquainted, we should own that he had made a substantial contribution to the solution of the labour question. There are employers who have met the men half-way in this matter. They have declined to accept the responsibility which would necessarily fall on them in the event of their being recipients of the men's savings. The management of their business would be so grievously impeded, had they to render account at every turning of their doings. But it has occurred to some firms whom we could name that there might be found an outlet for the men's savings, and that a tie between masters and men might be created, in the shape of

perative society, as attached to the
 The masters sink so much in this
 the men do the same; both use it;
 receive the same advantages from it;
 elp to govern it; and thus there is
 ed a channel for the investment of the
 s of the men. Mr Brand may be quite
 when he alleges that "we shall never
 o a satisfactory settlement of the rela-
 between employer and employed, until
 the latter, according to the amount of labour
 and capital he has invested, has an interest
 in the good conduct of the affair." But in
 the meantime, and as prefatory to larger
 achievements, we see with pleasure the suc-
 cess of even tentative movements towards
 that goal to which Mr Brand points. And
 that goal is the peaceful and harmonious co-
 operation of labour and capital, free from
 the wasteful warfare of strikes and lock-outs.

THE WORK OF THE FRENCH PEASANT FARMERS' SEED FUND.

LORD VERNON publishes a letter
 which he has received from Mr. John
 , whose services, his lordship says,
 n officer of the Red Cross Society, and
 as a representative of the French
 nt Farmers' Seed Fund, give a weight
 opinions. Mr Furley is engaged in
 uting a small balance which it was
 ary to keep in reserve to meet contin-
 s." In his letter to Lord Vernon, Mr
 r says:—

have just returned from a tour through
 ne, Luxembourg, and the Ardennes.
 g the last two years I have so fre-
 y written to you about the waste and
 ction occasioned by the late war, that
 great satisfaction to me now to be
 o tell you how rapidly this country is
 ing its wonted appearance—though in
 places evidences of the campaign are still
 lly conspicuous, and still to assure you
 generally good results obtained from
 bours of the committee of which your
 ip is the President. I passed hur-
 through Lorraine. I visited Luxem-
 in order personally to thank those
 is who at the outbreak of the war
 ed me so much willing assistance;
 Thionville, and afterwards came on to
 . A return of fine weather, and the
 se of abundant crops, have made
 : more or less forget their trou-

bles. I spent a day in the neighbour-
 hood of the town. I crossed the now cele-
 brated battlefield, and at Douzy had a long
 conversation with the Curé and those per-
 sons with whom I lodged during the fort-
 night that succeeded the battle. All de-
 clared the crops to be very fine, and far
 beyond the average, and they said that ten
 days of sunshine would be of incalculable
 value to France. I also called on M. Missot,
 the Curé of Bazeilles, who has shown so
 much energy on behalf of his unfortunate
 parishioners, and whose appeals on their
 behalf have been responded to from all parts
 of Europe and America. The village, which
 was utterly destroyed, is rapidly rising again
 from the ruins, and its present appearance
 indicates that its former prosperity will again
 return to it. I was struck by a sign over
 one of the best of the well-built stone houses
 in the principal street; French vitality is
 well expressed by the words printed in large
 characters on the front of this inn, which is
 decidedly superior to its unfortunate pre-
 decessor, *Aux ruines de Bazeilles*. Often
 during the day my thoughts wandered from
 the cheerful scenes before me to that memor-
 able time, not quite two years ago, when on
 fields from which every vestige of verdure
 and fertility had been trodden out of the soil,
 I stood among the dead and the dying. Now
 golden corn and patches of green crops

stretch as far as the eye can see, but here and there a white wooden cross with a faded wreath suspended to it is visible over the waving ears of grain.

"Two days ago I was at Mezieres (Ardennes). The terrible bombardment to which this town was subjected is still very evident, but many houses have been rebuilt, and the fine church which was very much injured has been restored, with the exception of some of the windows. The Mayor, the Comte de Bethune, being unwell, and confined to his chateau a few miles out of town, on the borders of the forest, in which the limits between France and Belgium are so difficult to trace, I had an opportunity to see additional proof of the wealth of the present harvest. A few words in conversation struck me as particularly expressive. It was remarked that ten consecutive years of such harvest would restore France to her former position, and a farmer replied, 'Ten consecutive days of such weather as this, and France is saved.'

"Wherever I go the greatest gratitude is expressed for the aid rendered by England to the innocent victims of the war, especially through the *Daily News* Fund, the Society of Friends, and that Society in which I have the honour to be associated with your lordship. In some places actual starvation was warded off by means of these societies. The mayor of a village told me the other day that the peasantry, when first they saw the seed sent out from England, could scarcely believe

that the donors were disinterested, while some even suggested that the grain would be found to be worthless. They were, however, persuaded to sow it, and the result has been so successful than in more than one commune they are now anxious to know how they can purchase similar seed in future. This will, I am sure, be gratifying information to those gentlemen who devoted so much time and valuable experience to the selection and purchase of the seed. I have not thought it necessary to weary you with details as to the manner in which I am disposing of the balance left in my hands. I will send the receipts and report as to the manner in which the money is expended to Mr Jenkins in the course of a few weeks. In distributing this sum, including the £200 sent to me a fortnight ago, and the £100 intrusted to me by the Society of Friends, I use my own discretion, the original object of the Seed Fund having necessarily changed with the season. I merely confine the money exclusively to small cultivators for the purchase of anything useful to them in agriculture.

"Although at the outset of this special undertaking, owing to the war of the Commune, I was more or less debarred from serving the Seed Fund to the full extent of my wishes, it is a satisfaction to me to feel that I have since been of some use, and that my presence in France has enabled me personally to distribute every shilling committed to me without any deduction for expenses."

CO-OPERATIVE FARMING.

an entertainment given by the Speaker of the House of Commons to the lords on the Glynde Estate, the Speaker, congratulating those present on the excellence of the harvest in the district, and remarking that it was not so bountiful in others, "It will be in your recollection that three years ago, when we assembled in it, I called the attention of the young men in my employ to the necessity for those who could not then read and write, and who were to remain in my service, to learn to do so at once; and I warned them that they did so they would not continue in my service. I am happy to find that that has produced a good effect, and I wish to adhere to the principle that all who wish to be employed by me must be able to read and write before they can be engaged."

Now, I suppose that in these times, when there is so much talk about the rates of wages, you will hardly think I am doing my duty. I do not say something in reference to agitation which is going on throughout the kingdom. My opinion is we shall never have a satisfactory settlement of the question of what the labourer receives, in some shape or other share, though it may be a small one, of the profit of the business in which he is employed. I refer not only to those employed in agriculture, but to those engaged in mining, manufacturing, and in trades of all kinds. You will say, how is the labourer to get his share of the profits of farming when he has no capital? Well, it is quite true that he has no capital beyond his labour, but what is his capital? Capital is nothing more than labour husbanded. Now, if he could save any money, however small amount, and could invest it in carrying on the business, I think, according to the sum so invested, you would be entitled to a share in the profits of that farm. I will give you a

practical illustration of what I mean. Some of you, I dare say, are fortunate enough to have a few pounds in the savings' bank, and I believe the savings' bank limits the interest paid on the investments to $2\frac{1}{2}$ per cent.

"Now, I will make a proposition to you, and to all in my employ. If you have got £5, we will say, in the savings' bank, and you would like to lend that to my farming business, I will engage to give you, as the savings bank does, $2\frac{1}{2}$ per cent. for the money. And I will do more than that. I will, supposing the profits of the farm amount to more than $2\frac{1}{2}$ per cent, upon the money I have invested, I will give you rateably precisely the same interest upon the capital you lend me. That is to say, supposing I get 10 per cent. as profit on the capital I have invested on the farm, you shall have 10 per cent on your £5 instead of $2\frac{1}{2}$. So you see you will be in this position—that you will never get less than the $2\frac{1}{2}$ per cent. you receive at present, and if the farm yields more you will have the benefit of it. Some will probably say, "How am I to get the £5?" Well, we know it does not rain £5 notes, but I will suggest to those who have not that amount in hand that they should lay by so much a-week. The rate of pay to the boys is from 3s. 6d. to 4s. per week, and the wages increase according to the ability to work. The carters, shepherds, &c., for instance, receive about 15s. per week, and out of this it seems to me it is by no means impossible that some may save 2s. a-week; and if you pay me that sum I will engage, at the end of the year, to pay you the £5, if you desire it, plus $2\frac{1}{2}$ per cent., or whatever higher rate of interest arises from the year's farming operations. I am quite sure of this, that we shall never come to a satisfactory settlement of the relations between employer and employed until the latter, according to the amount of labour and capital he has invested, has an interest in the

good conduct of the concern. My sole object is to give you a personal pecuniary interest in the conduct of the farm, and to endeavour to raise you a little above the position you now occupy as labourers."

The right hon. gentleman's propositions were very favourably discussed by the men during the day.

The following excellent article on the above subject, initialed "A. F. B.," we extract from the columns of an American contemporary. The trans-Atlantic communication is one that will repay perusal. It is Mr Speaker's ideas elaborated and reasoned out more fully than the opportunity of an after-dinner speech usually affords.

It is never unwise to look about us, seeking to find a better way of accomplishing the objects of our daily care and toil. The co-operative system, as it is called, is one of an experimental kind as yet, and we can only regard it with theoretical favour or disfavour as we may see its workings, perhaps, improperly tested. So untried is this system, that we cannot see how it is to be readily applied to agricultural industry, and yet for what reason may it not be thus applied? Farming is frequently conducted on the general partnership plan, and wherefore may not we take one step farther on and adopt the co-operative method? We are continually finding our farm help less and less reliable, and less and less profitable; and why? As the mass of mankind are lifted up into a higher degree of comfort, and are becoming better educated, there is a natural and proper tendency to escape the ambition of the ambitious, and the soul wants of the soulless.

over again, this large sum for labour which is not generally worth it. Labour is truly a commodity in the market, offered in exchange for what it will bring according to the laws of supply and demand, yet it is of such sensitive character that you have to deal with it with peculiar nicety, or it takes wings and flies away from your control.

Labour, to be profitably directed, needs to be steady and permanent, so that plans for the near future at least may be developed and carried out. Labour requires to be somewhat interested in the results aimed at to give it good character; thus the labourer is morally sustained and encouraged to keep doing. Labour is rather inclined to feel itself antagonistic to capital, and in consequence thereof wages a sort of low warfare with it—at least striving to prevent itself from being beaten in the usage.

Capital and labour are common terms, and resolvable into all manner of shapes and forms. Capital *may* arrogate to itself a sort of despotism over labour, or it may combine with it in a perfect union; it may (as where labour is in great demand) concede to labour so much as to seem the milder and more subjective of the two, but it is safe ever to view it as a strong power in no way obedient to the command of labour, yet willing to unite with it on terms of reasonable character.

In the cultivation of general farm produce, the system of personal interest as applied to the operative or labourer is yet untried, so far as I am acquainted at least. The subject has a freshness about it that invites interest.

It is, no doubt, much easier to point out the difficulties of the present system of labour, than to suggest a good, practical substitute for it; but a change of the present system demands untried systems, and the future that it will bring is unknown in the past. If any one more prone to this than I am, let me suggest that the present system is not so bad as the slavery of the past, or even of other days.

do not suppose the co-operative principle from objections, but rather regard it as improvement, and presume that its imperfections may be, in some degree, remedied by experience. To illustrate the idea, let us suppose "A" to be a landowner and farmer; B, C, and D, labourers, or, as generally called, farm hands, seeking the usual employment that belongs to farming. It is presumed that "A" has some ready means, or if not, that the farm brings to market some product at a very early date; else how could this kind of labour be secured and paid for? If the farm labour costs us 30 dols. per week (including the planting and growing season). If then there is no difficulty in arranging the matter as to the present wants of the labourer, which must be carefully provided for, "A" puts in the farm at such a rental that it may be mutually considered worth, and to this the use of stock, and the use of 100 dols. as a labour fund, for which he holds tenantry and receive five-tenths of the profit. Now if he proposes to labour, let him be paid for this as are the others—say 10 per cent, or 10 per cent., one man to be president or director, another secretary or clerk of accounts, and still another treasurer or custodian of the funds, valuable personal property, &c.,

to distribute the responsibilities of the

situation will no doubt prove the best way, and if there be not offices for every one, let there be imaginary ones made, so that each one shall feel that he is a necessary part of the common enterprise. The matter of traditional or transient labour can be provided for, and made subject to the general rule.

This is very likely to strike some minds as a gross innovation of the established manner of employing labour, and to such minds it may appear quite wanting, when weighed in the balances of a "sober second thought;" but the present feeling of the labourer is somewhat changed from what it was a time ago, and seemingly his feelings now tend toward emancipation from hired service, unless he is dealt with more liberally than of old. It is surely wise to accept whatever of facts there may be in the case, and to conform our line of action to suit the reality of the situation. We cannot unmake the condition of the labourer's mind; but we can make a new form of labour service. If the mountain will not come to us, we certainly can go to the mountain. I know several farmers who have given up the use of hired labour on their farms because of its lack of profit, and I know of others who continue to hire without seeing any gain therefrom; to such there seems a remedy wanted. May not this co-operative method be that remedy?

THE GREAT MEAT QUESTION.

A NEW company for the supply of the best preserved meat at a cheap price, and in quantities suitable to the convenience of the poorest, has just been launched, and, we understand, with every prospect of success. In fact, under present circumstances, such a company can scarcely fail. Home-grown meat is so short in supply, and so dear in value, that even middle class people are chary of purchasing it; indeed their means will not admit of them consuming it to the extent that they would do were the terms more moderate. The imports of live foreign cattle are falling off because the prices obtained here are not so remunerative as they once were, especially since the Tonning beasts were consigned to Deptford market, from whence so small a profit is returned, that consignees are beginning to think it not worth their while to run the risks attending their transport. In fact we understand that they scarcely realise, after deducting freight and other expenses, more than they cost in the inland districts. Another thing with reference to foreign cattle is that much danger of disease is involved in their importation. Then, again, the best animals from abroad are now little lower in price than our own, the quality in fact not warranting much reduction. The rapid strides which foreigners have made within the last ten years in feeding, is little short of wonderful. As evidence of this, the fact is stated that a certain foreigner, who has been in the country for some time, and who has seen the best of our own cattle, has been known to say that he has never seen any so fat as the foreign cattle.

Hear what everybody's good friend *M Punch* has to say about this food, and we are sure nobody will ever accuse him of recommending anything unwholesome or un-English, or of being careless about tenderness and flavour, or indelicate in taste for meat :-

THE SIRLOIN SUPERSEDED.

Once mighty roast beef was the Englishman's food.
It has now grown so dear that 'tis nearly tabooed.
But Australian beef, potted, is cheap and is good.

O, the boiled beef of Australia !

And O, the Australian boiled beef !

It is capital cold ; it is excellent hot ;
And if a large number of children you've got,
'Twill greatly assist you in boiling the pot.

O, the boiled beef, &c.

First-rate is Australian mutton, likewise,
For curries, and rissoles, and puddings, and pies.
The thrifty good housewife no butcher's meat buys.

O, the boiled beef, &c.

It will make you a hash that is fit for a king ;
And the young ones all like it, and that's a great thing,
So Paterfamilias it causes to sing.

O, the boiled beef, &c.

For the small boys and girls eat the fat with the lean
Don't leave underdone, but their plates nicely clean
Where pigs are not kept which helps make all serene

O, the boiled beef, &c.

Australian meat from the bone being free,
The more economical needs must it be.
As there are no joints there's no carving, you see.

O, the boiled beef, &c.

The flesh pots of Egypt were once in high fame ;
Australian fleshpots have more than the same.

England's roast beef is now rivalled in name.

O, the boiled beef, &c.

Wretched victims, who Income-tax pay,
Whom princely premiums are taken away,
Who, with a Butcher, can say
O, the boiled beef, &c.

Who, fastidious and fine,
Whom the world's folly decline.
Who, hereafter may dine.
O, the boiled beef, &c.

Who, who, which we could not afford
Whom the world's meat on the board.
Who, who, whilst my helping's encored
O, the boiled beef, &c.

notice that Dr Smith has been "ring a-muck" against the value of condensed milk and preserved meat alike; but Smith has his peculiarities, like other men, and his science cannot stand against practical experience of those who, having tried both articles, pronounce them good and cheap, and give daily evidence of the reality of their belief in their advantageously by constantly using them at their own expense.

It has been said, but very fallaciously, that the case for preserved meat is "going out" of this country. On the contrary, the very reverse is the case, as our summary in last month's Magazine of the Board of Trade shows issued up to the end of July conclusively proved. In the seven months of the year we imported preserved meat to the value of £485,434, whereas in the corresponding period of the year before we only imported £297,150, and in the like term of 1870 the total amount we expended for this article was only £101,739. It thus appears that our expenditure for preserved meats, instead of diminishing, has been about doubling in keenness every year.

We are glad that it is so, and should like to see it growing month by month. Our own people have cattle, "enough and to spare," for many years to come, and the great agricultural districts, south and west, are practically inexhaustible.

Under such circumstances, we regard with favour the organization of the Colonial Foreign Meat Supply Company, whose object is to extend farther than ever the importation of preserved meats. At present we cannot always buy a tin, in the locality it is sold; this company proposes, by the establishment of depôts throughout the United Kingdom, to sell this good and cheap food in such quantities as may suit the requirements of the poorest consumer. A remark in the prospectus struck us. It is this:—"While so much is being effected for the elevation of the masses, it is not amiss to remember that physical comforts add thereto, and that all such tend to the better performance of the duties of life." This is true.

A working man who can procure a good meal of cooked meat, without bone, is less likely to seek temporary and illusive stimulants, than one who gets no beef or mutton. A well-fed man is necessarily always the best workman.

In speaking of this new project the *Times*, in its money article of the 19th inst. says:—"The undertaking is supported by a number of leading people connected with Australia and elsewhere, and its object is to take all possible steps to secure the most constant and perfect supply of preserved meat from whatever region it may best be obtained, and by a thorough organization of depôts and other requisite establishments, to popularize its use among all classes. The present price of butcher's meat is equal to 1s. 8d. per lb. and the most carefully preserved meats can be furnished at 6d. per lb."

But while recommending in the strongest possible manner an extension of the means of introducing preserved meats into this country, we should also like to impress upon farmers the desirability of increasing their stock. This meat from abroad can never, save under the most deplorable circumstances, do more than fill up a very small hole indeed, in the stomachs of the teeming population of the United Kingdom. "The present state of the cattle question involves a greater subject than the price of meat—the question is, How is the cultivation of Great Britain to be carried on?" This is the pertinent remark of a correspondent in Thursday's *Times*, and his following observations are so well worthy of serious consideration that we give them without abridgment:—

This question will have to be solved with the cattle question. No doubt cultivation will be carried on in some fashion as long as it can be, but unless the cattle question shall be speedily put on a satisfactory footing, it will not be long before the high price of meat will be accompanied by a chronic and more serious difficulty—viz., a permanently high price of flour.

Agriculturists of very considerable experience will admit that quite independently of the meat-price question, the most solid and lasting improvements

which can be effected in cereal cultivation, on all except the heaviest soils, can only be permanently carried out in proportion to the numbers of live stock kept upon the area to be improved. If these decrease to any appreciable extent, to that extent is improvement in cereal cultivation put a stop to. For a time artificial manure may be substituted, but in the long run the want of cattle will surely be felt. I have nothing to say against artificial manures—they are good auxiliaries, and, as stimulating root crops and bringing them up to the hoe, they are admirable. They are, however, or ought to be, only auxiliaries, and as the following facts are somewhat remarkable I give them for consideration, leaving others to draw their own conclusions :—

1st. On my own cultivated area no artificial manure is used.

2d. There has never been on that area either pleuro-pneumonia, foot-and-mouth disease, or rinderpest.

3d. Sheep coming there with the old lameness only have speedily become quite sound.

No doubt the area in question is exceptionally circumstanced and obtains an extra and very unusual supply of farmyard and cattle manure, though if there were still more of it I should be better satisfied. The general consequence of this method of cultivation is that the further it is carried the better is the result, as well for cattle of all kinds, as also for every kind of cereal crop and artificial grass, except Italian rye-

grass, which latter, being poisonous to a succeeding wheat crop, I do not permit.

Allowing, then, for varieties of seasons, upon which we are all dependent, my experience leads to the conclusion that the cultivation of cereal crops in Great Britain is very much dependent upon the numbers of live stock maintained upon the land ; and if this be so, the cattle question and the bread question will not long be far separate ; for, depend upon it, a decreasing English wheat crop will not always be met by cheap foreign supplies.

The way out of the difficulty seems plain enough, but both questions would have to be dealt with as very intimately connected ; and when so dealt with might not, until the result became apparent, be very palatable to any but men born to face difficulties and achieve results—a very small minority of the people concerned. The result, however, to be accomplished is the great increase of all kinds of English cattle ; and, consistently therewith, the great improvement of probably three-fourths of the soil of Great Britain. Surely this is worth attempting !

The writer gives his name and address, Mr Albert Williams, East Ilsley-hall. We wish he would make known his ideas as to how best to set about increasing our stock. This omission we hope to see him shortly supply.

HOW TO INCREASE OUR FOOD SUPPLIES.

DEEP cultivation by steam; hedge-rows, fostering rabbits and destructive birds, uprooted, and table-cloth plots of ground transformed into 40-acre fields, would, according to Lord Dunmore, assure an addition from £28,000 to £37,000 per annum. These

[illegible]

in absence of actual test, are in favour of their accuracy. The advantages of steam-ploughing his Lordship does certainly not over-rate. A six-furrow plough can turn over about as much in a day as two dozen horses, and at two-thirds of the cost. Then the shares can be made to penetrate the ground to a much greater depth than ploughing can be accomplished by horses. Then, again, steam-ploughing is much speedier than horses, can be made to work at an angle of over a greater breadth of ground than horses can be. It is also the proper time in September when the land is dry and the sun hot to kill the weeds which have been sown by the cultivator. The steam-plough makes level the surface of the land and ridges and furrows disappear before

its operation, and so the path is made straight and easy for the reaping machine, thus effecting a great saving in the cutting of crops. Another matter of importance in connexion with the application of steam to the cultivation of the soil which Lord Dunmore appears to have overlooked, is the fact that the treading of the horses' feet is done away with. No sodden hoof prints are left upon the ground to the detriment of the seeds therein deposited. In fact, in every particular, steam surpasses horse-power in the way of culture, and the cost of the better work it does is much smaller.

Lord Dunmore estimates that by the grubbing out of hedge-rows the amount of land reclaimed, as it were, would be about an acre in every forty, which, say on a 200-acre farm, would be 5 acres. Supposing this land to yield 4 qrs. of corn per acre at £2 per qr., we should have an increase of £40 per annum, or in the case of a 21 years' lease a gain of £840.

To prove that by the use of steam instead of horses in agriculture, we should effect an immense amount of saving, Lord Dunmore adduces an elaborate array of figures regarding our home-grown produce, dividing this into two heads, "breadstuffs" and "live stock." His lordship takes the year 1871 for his basis. He says (we take a summary of his figures from the *Times*): "Wheat at 3 quarters per acre, and deducting seed, yielded 10,993,162 quarters, worth, at 47s., £24,658,430; barley, at 4 quarters per acre, and deducting seed, yielded 9,467,860 quarters, worth, at 34s. 6d., £16,332,058; oats, at 4 quarters per acre, and deducting seed, yielded 15,448,556 quarters, which, at 23s., were worth £17,765,839. But taking three-fourths as consumed by horses, there was left £4,441,462-worth as food for the people. Rye, at 4 quarters per acre, and deducting seed, yielded 306,888 quarters, worth, at 35s., £537,054; so that the total value of the home-grown cereals directly furnishing human food (bread, beer, &c.) was, according to this estimate, £45,969,504. From this sum must be deducted the exports—namely, £1,878,452-worth of barley as malt

or beer, £543,597-worth of wheat, £163,197-worth of flour, and £429,272-worth of other corn. Potatoes, reckoned at 6 tons per acre and £4 per ton, gave a value of £40,651,800. Green crops, as mangolds, turnips, &c., at 10 tons per acre and £1 per ton, were worth £35,000,000; and taking half these crops as furnishing food to the people indirectly, as milk, butter, cheese, and meat (the other half going to maintain the breeding stock of the country), the value of food from root crops is set down at £17,500,000. Adding £5,000,000 for peas and beans, Lord Dunmore considers that the total value of our cereal and green crops available for consumption by the population of the United Kingdom is £106,106,786."

With regard to live stock, Lord Dunmore reckons that one-third of the total number of cattle is annually slaughtered, the value per head being £20. This gives a consumption of beef equal to £62,308,100. Of the whole stock of sheep, one-half are yearly made into meat, worth at £2 per head, £31,403,500. Of pigs, two-thirds are slaughtered, worth at £2 per head, £5,515,488. From the total of £99,227,088 must be deducted £888,143-worth of exports, leaving the value of the live stock annually butchered £98,338,945. Thus, the value of our available home-grown food, "breadstuffs" and "live stock" together was, in 1871, £204,445,731; and, reckoning the value of the imports in the year at £44,714,289, and the requirements of the nation amounted to a value of £249,160,020. The writer says:—

The home supply, therefore, falls short of the requirements by £44,714,289; or, in plain language, we grow at home enough for 22,000,000 people only, and yet we have 31,000,000 to supply. Can we find a remedy for this deficit, and thus render ourselves independent of these foreign importations? We might surely find a partial remedy, at any rate, if not an entire one; and it is to deep cultivation by steam and the utilization of sewage that we must look as our two most important auxiliaries. The general introduction of steam cultivation would make a very material increase in our home products, as we know by practical experience that steam culture increases the produce of the land to the extent of one-fourth, some people say to one-third. But, allowing only for the partial introduction of steam, and allowing

that half the arable land in Great Britain which is now worked by animal power were cultivated by steam, it would give an annual increase of £7,000,000 of home-grown food in cereals alone; and as deep cultivation by steam has a more powerful influence in increasing the root than the cereal crop, we may estimate that if half the land under green crop were worked by steam, it would give us an increase of £12,000,000 worth of food, which would come indirectly to the people through cattle, as meat, butter, &c.

Lord Dunmore sets down the amount of produce consumed by each person to be £8 per annum. If therefore the home produce was augmented to the extent of £19,000,000 it would be equivalent to the support of 2,375,000 more people. Then there is the saving to be effected by the food of horses which steam would enable farmers to dispense with. His lordship calculates that 1,500,000 horses are engaged solely in agricultural labour, and these on the average cost £35 each annually. "There are 529,950 farms in Great Britain. If steam cultivation became the rule, instead of the exception, there is no doubt that there would be made a reduction on an average of at least one horse per farm, which would save £18,548,250 worth of food. But even supposing that the average reduction was one horse to every two farms there would be a saving of £9,000,000. The result would be that, in augmentation of produce and saving of horse keep, we should

increase our available home supply of human food by a value of £28,000,000 or, perhaps, £37,000,000, and thus dispense with a large portion of the £44,714,000, worth of imports, which we now depend on.

Lord Dunmore, it will be remembered, was keen to enthusiasm about Thomson's traction engine as an aid in cultivation. He has seen reason to alter his opinion about the superiority of a machine running over the soil, dragging an implement after it. His own experience was sufficient to convince him that the plan, on some lands, was not practicable, and that it was by no means profitable. His Lordship, while not scanty in praise of the systems of other makers' steam-tackle, gives preference to Fowler's double engine method, but it is so expensive that in order to get it more extensively into use among farmers, his Lordship suggests that private companies should be established by landlords and influential agriculturists for the purpose of letting such implements out on hire. We trust that Lord Dunmore's recommendation will be taken heed of—acted upon, and with intelligent and enterprising men like himself in connexion with such companies we have little fear that they will turn out a decided success to the shareholders, and a great boon to the farmers who take advantage of their aid.

DR SMITH ON CONDENSED MILK AND PRESERVED MEAT.

THE following is the first of a paper read by Dr Edward Smith, F.R.S., before the British Association, on "The Economic and Nutritive value of the three preserved foods—preserved milk, preserved meat, and Liebig's extract of meat." The large proportions to which the consumption of these preserved foods had attained rendered it most desirable that the public should understand their value, both in the pecuniary and nutritive aspects of the question. There were several difficulties in the way of this, for time had not permitted the unscientific to judge of these products by experience, while the composition was not a fixed and known quantity, but variable, and could be determined only by chemical analysis. Hence it could not be surprising that there was much ignorance and even misconception on the subject, and in offering his own knowledge, he should do so, he said, in a summary rather than in a detailed manner. Speaking on preserved milk, which was made in England, Switzerland, and America, he first described the manufacture of that made in America and sold in England, and then pointed out that one pint of the product represented four pints of milk. Four pints of milk would cost, according to locality, from 4d. to 8d., but the "pint tin" of preserved milk held only 16 ounces, and not a pint, which was equal to 20 ounces, and, making allowance for the sugar which was added to the preserved milk, the weight of the preserved milk was about 14 ounces, or two-thirds of a pint, and represented a value of $2\frac{3}{4}$ d. or $6\frac{1}{4}$ d. according to locality; but the price of the tin of preserved milk was 10d. or 1s., and, therefore, was not an economical, but a dear food. It was, however, he said, a useful invention, in so far as it added to the food of man which in many localities would otherwise be given to the pigs, and there was every reason to believe that it was was most profitable to the manufacturer.

Another point he drew attention to was that as sugar was cheaper than preserved milk, and had different and inferior properties, according to the quantity used would the milk-value of the compound be reduced, and the temptation to the manufacturer was to use the *maximum* quantity. The Aylesbury milk contained 2 ounces in the pound, or $12\frac{1}{2}$ per cent., and it was said that there were other kinds which contained 3 ounces, or nearly 20 per cent. of sugar. It was possible to prepare the "condensed milk," not only with wholly new milk, but with skimmed, and with a mixture of the two—skimmed and new. The latter was said to produce the "smoothest" and best preserved milk, and there could be no doubt that a considerable proportion of the cream was first taken from the milk to be pressed in order to make butter. Therefore the product, though of value, was not new milk, and as in the important use of milk the feeding of infants and young children, the fat was as necessary to nutrition as the caseine and other elements, new unskimmed milk, and not "preserved" milk, was required. It was a significant fact, he added, that the milk-condensing companies were also butter makers on a large scale, and competition doubtless would show itself in these directions—increased proportion of water and sugar, and lessened proportion of cream and butter. He closed his remarks on this portion of the subject by pointing out that in preserved milk we have a product of uncertain composition and nutritious value.

The "preserved meat" brought under consideration was that now so widely known as the "Australian." He described the process of preservation, and stated that 6 lb. of raw meat, with a proportion of fat, were placed in a tin, which was put into a bath of chloride of calcium, and exposed to a temperature higher than that of boiling water, namely, from 230 deg. to 250 deg. The tin was sol-

dered and closed except at one point, where there was a hole through which the steam escaped. The object to be obtained was primarily the expulsion of the air from the tin, and, therefore, the high temperature required; and, secondly, the cooking of the meat, which, however, might be effected at a much lower temperature. The tin, to prevent too great loss of weight, was "primed" from time to time, so as to keep up the weight of the contents. The circumstances to be remarked in the process were—first, that the meat was neither roasted nor boiled, but stewed in its own vapour; second that it was overcooked, so that a larger proportion of the soluble materials was extracted than occurred in the ordinary process of boiling, and the solid part was more or less broken up into bundles of fibres; third, the extracted juices were more valuable than from ordinary boiling of meat; and by so much the solid mass was less valuable than ordinary boiled meat; fourth, the peculiar flavour was given partially by the mode of cooking, but chiefly by the addition of the flavour of roasted meat, which was agreeable. The solid matter, although soft, was not easily masticated, since it eluded the grasp of the teeth, and without free mastication it was less perfectly digested. The conclusions to be deducted were classed under different heads. The nutritive value of the whole of the contents of the tin could not be greater than that of the raw meat put into the tin, and hence, although the meat was cooked, the comparison of the value must be with raw meat and not with cooked meat. If, therefore, a dietary was 4 ounces of cooked meat, the Australian meat would have to be supplied in the same quantity as the raw meat might have been before cooking, namely,

4 ounces of raw meat
 4 ounces of roasted meat
 4 ounces of water
 4 ounces of salt
 4 ounces of sugar
 4 ounces of vinegar
 4 ounces of oil
 4 ounces of butter
 4 ounces of yeast
 4 ounces of hops
 4 ounces of malt
 4 ounces of barley
 4 ounces of rye
 4 ounces of wheat
 4 ounces of corn
 4 ounces of peas
 4 ounces of beans
 4 ounces of lentils
 4 ounces of chickpeas
 4 ounces of mung beans
 4 ounces of soybeans
 4 ounces of adzuki beans
 4 ounces of black beans
 4 ounces of green beans
 4 ounces of kidney beans
 4 ounces of lima beans
 4 ounces of pinto beans
 4 ounces of navy beans
 4 ounces of great northern beans
 4 ounces of cranberry beans
 4 ounces of butter beans
 4 ounces of cannellini beans
 4 ounces of chickpeas
 4 ounces of lentils
 4 ounces of mung beans
 4 ounces of soybeans
 4 ounces of adzuki beans
 4 ounces of black beans
 4 ounces of green beans
 4 ounces of kidney beans
 4 ounces of lima beans
 4 ounces of pinto beans
 4 ounces of navy beans
 4 ounces of great northern beans
 4 ounces of cranberry beans
 4 ounces of butter beans
 4 ounces of cannellini beans

the amount of food for man, and so far must be of universal advantage. As to the English consumer, taking beef supplied to institutions as at 7d. and 7½d. a-lb., he thought there was little gain in the use of the Australian tin-meat in those cases, but there was a gain to the individual consumer who had to pay more to the butcher for his meat in this country. He advised that the recommendations laid down by the original importers of the meats should be adhered to in respect of not cooking the meat further than by preparing it in a stew or soup, without more than warming it, and to use it only as a change of food.

Respecting Liebig's extract of meat, he pointed out that it was claimed for this that 1 lb. jar represented 32 lb. of flesh meat. Its composition was water, and, in large quantity, the salt of meat and the phosphates. It contained only the soluble parts of meat, and only such as could be preserved from putrefaction. The fibrine or solid substance of the meat was excluded, for that was insoluble in water. The fat was excluded most carefully, as it would become rancid. Gelatine and albumen were excluded because they would decompose. When, therefore, fibrine, gelatine, and albumen were excluded, it was certainly not "meat," which was left as the word was understood, for nearly every part of the meat which could be transformed in the body and act as food was excluded; therefore, Liebig's extract of meat was not meat, and to give the meat power, the 32 lb. of meat from which it was said to be taken must be added to it, for as it was it was the play of *Hamlet* without the character of *Hamlet*. The product was of less value to the consumer than to the producer, and the preparation was of a delusive rather than a real advantage; but, although he said this, he held that it had a value as a stimulant in the same way as caffeine or coffeine; but its economic value was very small as representing 32 lb. of meat in 1 lb. jar. There had been much misconception respecting the product, for Liebig never affirmed that it was meat, or the equivalent of meat.]

AGRICULTURAL STRIKES.

By S. G. O.*

I HAVE watched with no little interest the progress of the so-called contest between labour and capital, especially in that portion of it which has reached the field of agricultural labour. I think it has now arrived at a point when we have fair ground for the consideration, how far it will affect the relative position of employer and employed for the future. On both sides there has been a fair trial of strength in the way of attack and defence. I think it may be assumed that the opposing forces have each learnt a wholesome lesson. I am inclined to believe that when all is taken into account, the suffering caused to both, by the disturbance of their old connexion, will be pretty equally distributed.

It is my present purpose to deal only with the complete "revolution"—I hold it to be nothing else—the system of combining the agricultural labourers into "unions"—"combinations" to regulate the value and conditions of their labour—has wrought. I wish to point out some of these, the most important features of the labourer's life, as it must be affected by this severing of the local ties which connected him with those among whom he dwelt and for whom he worked, and his now becoming a member of a wide-spread confederation, in allegiance to which he must be content to live.

It is too late to offer any opinion as to the prudence or expediency of the labourer in husbandry working to place his daily interest, as such, under the same rule as other traders in hand labour. If "unions" have not become the rule throughout the whole agricultural field, if "strikes" have been as yet limited only to a portion of it, it must yet, I think, be admitted that enough has been done to shake all confidence on the part of the employers in any real return to the old state

of things. Looking this in the face it will be but natural that they should feel and act on the knowledge, that if this union system has not yet been adopted by their working men, these have it in their power at any time, however injurious to their employers, to adopt it.

It is vain to conceal from ourselves that an element of perpetual suspicion must now exist in the relation of master and man; that, if ever, it must be a work of considerable time to restore anything like real harmony between them, or to make confidence on either side more than skin-deep.

It is difficult for anyone who has passed many years of life behind all the scenery of agricultural life to conceive how farms can be worked on the commercial principle, as mills or workshops are; the farm staff to be regarded as just so many men taken on by the job, to be chosen for their power to do it, to be paid certain wages for it—and *that all*.

The work of a farm demands a great deal of elasticity in the rule governing the employment of those engaged in it. With the exception, perhaps, of the shepherd and herdsman, it would be next to impossible to draw any hard and fast line to which every labourer is to be limited. So much depends on weather, at all times, and more especially at harvest time, in the matter of work to be done, that I cannot see how either hours or the nature of any one labourer's work can be made subject to any strictly defined agreement. There must always be a certain amount of "give and take" on the side of the master and servant. If every extra pull upon the labourer is to be made subject to some fixed extra payment, is the farmer to be restricted from ceasing to pay when the weather, or other circumstances, may make it wiser to shorten labour?

* *Times*, Thursday, Sept. 5.
VOL. XI.

Hitherto, in a very large proportion of cases, the farm staff has been of local breeding and training, the latter process, as the rule, being carried on upon the local farms. From crow-keeping to driving the best horsed ploughs and waggons, from helping shepherd to becoming shepherd, in every branch of farm labour, the employers have learnt the character of each man or boy they employ; they know their breed, their habits, their exact value for this or that purpose, how far they can be trusted to do the work they undertake. The men from boyhood know the masters equally well; every peculiarity of their dispositions, so far as it may affect the comfort or value of employment under them, is well known. Doubtless there is as much criticism of character, noting of conduct, in the Pig and Whistle tap, in the cottage, in the Sunday exchange of gossip among the working class, as there ever was at a Vestry, or is now at a Board of Guardians, at market, or in the homestead parlour. As we are all so ready to observe upon the characters of those on whom we are in any way dependent, or from whom we hope to obtain anything, it is but natural that employer and employed in any one locality should look closely at the play of each other's cards.

There may, hitherto, have been more good in this than we may like to admit. It is a wholesome thing in a parish that the characters of all who form its population should be, in this sense, common property; that respect should thus become due to employer or employed as it may be deserved. It teaches the former the true value of the latter; leads him to kindly intercourse with

been done for them by voluntary charity, all the aid they obtain from the employers and others, who have known them all their days, the squire help, the parson help, &c., the guardian of the parish is, as the rule, ready enough to plead for them at "the Board;" they are well known to the relieving officers, relief is not only rarely refused when any plea can be made for it, but it is for ever given when the legal right to it is very questionable. In the matter of "cottage," be the accommodation good or bad, take it for better or for worse, the bred and born on the spot ever have better treatment than the "hired for the year"—the stranger taken on trial. It is well known that this latter class of labourer is not esteemed as a tenant; neither his own nor the habits of his children are known; and it is a generally accepted fact that there is a reluctance "to repair," where it is felt that the cottage is in what may prove a mere temporary occupation.

Lord Manyacres has sound ground for his opinion—"It is next to useless to keep the cottages of old Grindem's farm in repair, for he never keeps a man over the year, and makes his cottages mere lodgings for discontented men with unruly children." Surplice (the Rector) is right enough—"The children of this class are the curse of the school when they can be got into it; they have been bred as gypsies, with no respect for authority in-doors or out-of-doors."

Let us then try to anticipate the state of things when "the Union" is the *first master* to rule the labourer, the employer feeling that, to what he will for his men, treat them how he may, they have simply leave to work for him only just so long as the Union may permit, that at any season he may be served with information that his whole staff of labourers are prepared to put their hands in their pockets and do nothing, unless he will consent to go deeper into his own, and the "Union" orders of money for the wages negotiated by Union hours.

The labourers, in their own interest, will be very ready to stop the weekly renting of cottages to strangers of whose character they know nothing, but knowing this much about them,

they ever so industrious and steady, they at any time have orders from London, or some other centre, to strike work on the estate, and thus defeat the purpose for which they have been engaged as tenants. We must also bear in mind that in every great movement the distant bodies of agitators and controllers for ever discover that agitators in connexion with them are to take the reins in their own hands, with an independence which is immune from all advice or restraint from head-

quarters. Little thought upon this vexed to see that "union" rule will not solve its own difficulties, but that it gets, in the case of the agricultural union, a penalty they may not yet have anticipated. So long as these "strikes" are reported from "without" by a great voluntary sympathetic aid, it may be that they are in a condition to dictate their "terms," and wait the effect upon the employers of the suspension of work. It is a source of aid on which they can rely.

I am of opinion it is not. The union with popular movements is of a selfish character; it has a very cold and lowering the hot. The "trades" will only be taxed to hold their own combination; they have no real abiding strength, but they are not; their position with their employers is the analogy with that of the farm labourer and his employer.

It is well for those who seek to rule the "Agricultural Union" to consider the position it will have, not only on the farmer's domestic well-doing, his advantages derived from the kind interest the owners and the higher orders of his parish take in him, have as yet so often taken in his person and that of his children; but also in their important respects. In considering the question of relief at a Board of Guardians, the question of "earnings" of the labourer always arises, also does the question of belonging to "a club," and what does the labourer get from it? In practice, as I have said it for many years, it has been the

habit to count only half of what is received from the club in the calculation of what is to be granted for the relief of destitution by the board, this being held to be an encouragement of the labourers to belong to clubs. Is it in human, in ordinary guardian nature, not to also now demand, or, at all events, seek information as to what is paid to "the Union?" If a "strike" is on in one county, or part of it, and known to be levying weekly pay from all the rest, will not the knowledge of this fact tell heavily on applicants for relief from the poor-rate, to say nothing of how it may tell on local charitable associations supported by employers of labour? It must be borne in mind also, that the difference of 2s. a-week in wages will, in far the largest proportion of cases, *exclude the applicant from "relief" altogether*. Take the common case of a parish where the squire or squires employ a good many men as labourers in their gardens and grounds. Is it not the fact that the wages of these are, as the rule, 2s. higher weekly than those of the farming men; because it is so, it is rare for them to receive any parish relief except in very special circumstances? If all the wages are raised to this level, we may rest assured a very large amount of relief will be refused which is now for ever granted.

At present the farm staff are, as I have said, of local breed; they have worked where their forefathers worked, just as many of their employers live and rent where theirs did. So gradually do men drift into age and infirmity that, just as boys are but too often kept on boys' wages when they have become, as to their working power, men, so men are, on the other hand, still paid as men when real power to do strong man's work has long left them. To pay in future the union scale for piece work, day work, according to union measures and hours, will at once entail the raising all the wages of those who are *able to do such work*. If such a covenanted principle of labour be carried out to the letter, what is to become of the "ancients" of the farm? Do "the unions" expect that they will be kept on through winter and summer

As I have more than once written, he is deparochialized; his patriotism was simply parochialism, each parish a little of the magnates of which were the sole ties whose respect it was his interest to have, whose anger he had alone to

meet. It has always been a hard problem for the farmer—how educated men would be content with the monotonous, all-weather work of the farm. No amount of wages can make the farmer really grateful to those who have been his readers and thinkers. To such, also, the society fails to supply what they crave: intercourse with their class. Village societies, the penny readings, lectures, &c., have whetted the appetite for intellectual food which it is difficult to afford.

As the machinery will, I have no doubt, rapidly be developed in aid of farm-work; and as requiring in its use more intelligence, the farmer, if possessed of it, will obtain higher wages, and their work will be of a higher order of interest. I have no fear but these advantages may be obtained and retained; I, however, cannot be blind to the difficulty which we meet owners and tenants in obtaining a contented, industrious staff for the class of farm-work. Of this I am assured that "homes" will now be more important than mere pay, however forced upon the farmer.

The farmer must look to a mere "scratch" of land, sited anywhere, to be watched over, and seldom, for confidence is a plant of slow growth; men to work as by ring of bell, inasmuch as he has no interest beyond the exacting of the letter of his bargain with them, and as he has no real hold over them; or he must be taken to make farm work that will attract who go to it from homes which give a comfort, a domestic independence which rented homes cannot give; with this a sympathy of their "betters" to give them a personal kindly intercourse

which shall in its friendliness and care for their well-doing bind them to the spot by higher and nobler ties than those of mere bread-earning.

To disarm the agitator, the abuses which give him his chief weapons must be removed. To calm down the restless spirit which now prevails, there must be practical work done to convince the labourer that there is that to be found in a decent, well-adapted home, amid kind and sympathizing friends, in a country village, which is not to be obtained in the crowded streets of the towns to which he is now for ever invited. Treat him fairly in respect to the value of his labour, give him opportunity to have his children fairly educated, be patient of his feelings, prompt to show him all sympathy in his trials. "Give and take," taking the sweat of his brow as a matter of business. Bear in mind, you who own the land and you who rent it, like yourselves he has in him all the elements which go to make up love for domestic enjoyment; regard him in his home, off duty, as a fellow Christian, to whom peace and decency and undisturbed *abiding* there are as precious as to yourself.

Thus, and thus only, in my judgment can you hope to build up again the now shattered social state of so large a proportion of our villages; it must be a work of time, it is a work of necessity. My own belief is that in the end this strife will have worked out much real good. On the one side, the lesson will have been taught that much which was but just to the labourer has been utterly neglected; on the other, the lesson will have been read that to the labourer life is not a mere matter of wages and hours; the latter may be shortened, the former raised, and yet the lot, in his own and in the case of all his family, be much worse than that from which he either fled altogether, or so changed its conditions as to rob it of much, the loss of which he must acutely feel in days of trial.

RURAL COTTAGES.

A CONSIDERABLE amount of ill-feeling has been expressed towards the Royal Agricultural Society of England by architects who sent in plans of cottages for agricultural labourers, on the understanding that they had a chance of securing a prize. As our readers are aware, no premium was awarded to the competitors, the judges holding the opinion that no representation of suitable cottages was placed before them. Some of the exhibitors question whether the Society had a right to keep back awards. They maintain that no option was left to the Royal under the conditions upon which the plans were sent in, than to give prizes to the best, whether they were perfection or not. Of two evils it is said, "choose the least," and if none of the elevations and the specifications were exactly of the kind the Society thought comfortable and inexpensive for the working rural population, it still should have indicated by a choice what was nearest the mark. It has been said, we know not with what amount of truth, that a similar case has occurred before, and that plans rejected or debarred from a prize have been made use of afterwards, without the originator deriving any profit therefrom. If such were the case it was a bad one.

It is also not pleasant to learn that letters from competitors at the Cardiff exhibition, requesting to know upon what grounds the prizes were withheld, have never been answered. It is not pleasant to learn that the plans which were rejected, and which were not made use of, were not returned to the competitors. It is not pleasant to learn that the plans which were rejected, and which were not made use of, were not returned to the competitors.

nected with the office affable and eagerly anxious to oblige at all times.

And now with regard to the plans themselves. We quite agree with the judges that they were not of a generally suitable character for agricultural labourers. There were in most of them too much money thrown away upon useless and not always effective ornamentation. We are far from thinking that a ploughman's cottage should be plain to ugliness. On the contrary, we hold that it should be constructed so that it would add to, rather than detract from, the beauty of the landscape. But the main object in such cases should be to supply comfortable and convenient rooms, and to eschew corners, and nooks, and crannies of every description where dirt can accumulate. These conditions were not fulfilled by the Cardiff plans. The price of the double cottages was fixed at £220, and it was curious how near all the architects came to the stipulated cost, some of them coming within 2d.

Rural architecture of the kind needed for agricultural labourers is not yet sufficiently well understood. The designers are not intimate enough with the habits of the population, and they are nearly in all cases too ambitious to produce a picture. It would be worth the while of some of our talented young architects to devote special attention to this class of work, as with the increase of wages the demand for better cottages is sure to come. There will be plenty of work in this direction for many years, and a competence would be gained by any one who can manage to combine elegance with comfort and cheapness, being an essential matter.

HORSES AND HORSEMEN.

THE *Sportsman's* "Special Commissioner" pens the following excellent remarks under the above heading:—

Xenophon wrote that "it is on horseback gods and heroes are painted," and that "men who manage their horses gracefully present a most magnificent spectacle." Although this would be considered a rather extravagant style of writing in the present day, every true-bred Briton will readily admit that practical horsemanship is a most desirable and agreeable accomplishment. There is also a freemasonry among men who are accustomed to ride, buy, sell, breed, train, or in any way to use the noble animal, that almost instantly secures a kindred feeling in any part of Europe. After a conversation in reference to the production, capabilities, or value of any kind of horses, men who have never met before have laid the foundation of a friendship which has endured for years. It is true that practical experience in equine knowledge is sometimes dearly bought and difficult to attain, but there are thousands of plucky Britons who are still determined to have it at any price. The science of horsemanship is also one of the great incentives to maintain the chivalry of our race, and it would be a sorry day for the British people if hunting, steeple-chasing, or racing were suffered to fall into the category of what is termed—by the maw-worms of society—"vulgar sports" that ought to be put down by Act of Parliament. What can be more noble or spirit-stirring to the thorough Englishman than to participate in a ride to hounds in full cry, or to witness the take off, the graceful rise into the air, and the simultaneous drop of perhaps five or six horses at the water-jump in the Liverpool Grand National Steeple-chase. Springing from the green turf or rather slushy soil on the margin of the artificial brook, away they stream over nearly five miles of country, the best of perhaps a score of competitors skimming over the

twenty-eight fences like swallows in their flight, while thousands of people are transfixed, as it were, with wonder and admiration of the speed and endurance of the horses, and the pluck and skill of their riders. Such is the estimation in which horses and horsemen—combined with the sport they provide—are held in this country, that I am not exaggerating when I state that millions of people are annually congregated on the racecourse in the British isles to witness the fleetness of the one and the prowess of the other. These represent all classes of society—as of old—from the crown and the coronet to the crossing-sweeper. Such incidents and associations connected with the turf and the chase have most assuredly a direct tendency to foster and improve the nervous energy and natural courage of mankind, and to improve the quality of horses. In fact, the immense sums of money given as prizes to be run for on the turf are direct proof that racing has, ever since its first institution in England, been the very best means of encouraging our breed of horses. Last season, the stakes for the Derby amounted to 5125 sovs., the St Leger to 4800, and the Two Thousand Guineas to 4350 sovs. It is almost invariably the best formed, most powerful, and soundest horses that win these prizes, and if this is not a sufficient encouragement to breed them, I do not know what other plan to suggest. Then we have the splendid trophies in the shape of cups to be also run for and won by the best horses over long and short distances, to say nothing of the almost countless prizes, amounting, in some instances, to very large sums, annually won by animals of all ages. In fact, the turf is not only a self-supporting institution, but there cannot be a doubt in the minds of those who study the subject and have gained experience by travelling into the breeding districts, that it always has been and is still of immense

benefit to the Government, as a measure of improving the horse stock of the nation, and providing a source of pleasure and healthy recreation for the people. What would the British army be without efficient cavalry; and in which of the many battles fought by this arm of the service have they ever "caved in?" is a question that can always be triumphantly asked by the horse-breeders of this country. These have, in fact, found good horses for the Government to starve them, and thus render both the animals and their riders comparatively useless through imbecile management—as in the Crimea. A number of thoroughbred horses suitable for cavalry remounts could be supplied by English, Irish, and Scotch breeders if the Government would only pay for them. Farmers now find it far more profitable to produce beef and mutton than troop horses, and the Government will not pay one-hundredth part of the sum for a horse on which to mount the finest cavalry soldier in the army as that which supporters of the turf are constantly "forking out" for the superb animals that win the great races. Our very best horses—and the cream of progeny—have been, generation after generation, kept solely for racing purposes; while the refuse of the same stock crossed with mongrel breeds have carried our cavalry through many a wearying campaign, and many a hard-fought battle. Thoroughbred sires that travel the country, in some instances serving farmers' mares at one guinea each to such an extent that their powers become enfeebled, are the rejected refuse of the breeding studs for turf purposes, and may be compared to the quartz from which pure gold is extracted.

In the days of "Brown Bess," when slow infantry soldiers loaded and fired slow

weapons very slowly indeed, slow horses could get through a slow charge creditably enough, and except in a high wind, when the priming was apt to be blown out of the pans of the old flint locks of their carbines, they managed to skirmish pretty well, but could not hit a haystack in this order except by chance. In these days of improved weapons, and rapid and accurate shooting by the infantry of our probable enemies, our cavalry ought to be mounted on troopers bred from pure blood on both sides. If ever the time arrives when the safety of our country is the stake to be played for, the Government may consider that it would have been quite as good policy to mount our troops on the best horses that could be produced as it is for the supporters of the turf to breed, buy, and train such animals to win the Derby and St Leger, or any other turf prize, the best of which is mere dross as compared with the honour of old England.

By adopting the system of mounting our soldiers on thoroughbreds instead of common cocktails there would be an additional encouragement to breed the former, and on the principle of the demand always regulating the supply for any remarkable commodity prices would soon come down, and horses for cavalry remounts, racing, and other purposes, would be far more plentiful than they are now. Better pay would also insure the enlistment of more intelligent, if not finer, men in the cavalry. When these were mounted on strong, sound, and well-built horses of pure blood we should have chargers and men superior to any cavalry we ever had before, and they would soon become as notable for quickness in their movements and efficiency on the battle-field as they would be enduring on the line of march.

STRAY NOTES FROM THE SOUTH OF IRELAND.

THIS year will undoubtedly be set down as an unusually bad one by farmers. I think it may be set down at the of their "Black List." Those trustworthy personages, "the oldest inhabitants," say they never saw the like. We had a spring, a wetter summer, and the wettest on record. The hay, a small quantity of which still remains uncut, has been damaged to deal. The potato crop is gone altogether; or nearly so. It had a very fine appearance until the 25th ult., when we experienced a furious thunderstorm, which was followed by a week's incessant rain. This, besides laying cornfields wholesale, and mowing hay in an awful manner, finished the potato crop.

One could not now "for love or money" find a single green stalk. They are all rotted or burned up, and the potatoes are entirely unfit for human food.

Wheat is a good crop, and as a large quantity was grown, the loss of the potato crop will not be so much felt as it would have been otherwise. Oats are a middling crop, turnips and mangolds are doing exceedingly well. Only a small quantity of flax was

made. This year has also been a bad year for butter, scarcely running to 112s. per cwt. in the market. In fact, unless for dry stock, it is an unprecedentedly bad year for dairies.

St-and-mouth disease has broken out in a great number of isolated instances throughout the country. I have heard of one or two cases near Waterford, one case near Killarney, and one case near Dromcolloher, County Limerick. You will see from this it is only a trifle, scarcely worth noting.

Fuel famine is also imminent. Coal, which in other years was bought at 16s., is now at 35s. per ton; and, in consequence of the weather being so wet, it was impossible to get enough of dry. "Necessity is the mother of

invention," we are told, and I suppose this is true, for the dearth of peat is now the principal topic in all our newspapers. Alderman Edward Purdon has offered the splendid prize of £100, open to all comers, to the inventor of "the best method of utilizing our peat resources." That this prize will not remain unclaimed may be seen from the following "card" which the worthy Alderman has just issued:—

Alderman Purdon has the pleasure of stating that the arrangements for the organization and speeding of the intended commission of inquiry for investigating the best modern systems for making improved peat fuels that may be found to be successfully in operation elsewhere, have made important progress this week, and that the following noblemen and gentlemen have, in the kindest manner, tendered their willing and zealous co-operation for the furtherance of the objects of the commission, to all of whom Alderman Purdon takes this opportunity of offering his most sincere thanks:—The Earl of Longford, Lord Viscount Powerscourt, Lord Talbot de Malahide, L. Waldron, D.L., Sir G. Hodson, Bart., Right Hon. More O'Farrell, Sir John Gray, M.P., Sir W. Wilde, Major Knox, D.L., Jonathan Pim, M.P., Mr V. O'Brien, Mr W. B. Smythe, Rev. Dr Haughton, F.T.C.D., Very Rev. Dean Keatinge, Mr Alexander M'Donnell, Mr C. Cobbe, Mr G. Taylor, C.E., Mr E. Gratton; Rev. W. Bagot, Mr H. U. Townsend, Mr T. O'Brien, Dr Hennis Green, Mr Brett, C.E., Mr A. C. Taylor, Mr H. J. M'Farlane, Mr B. Stoney, C.E., Mr H. Shaw, Mr John Bagot, Mr R. Heron, Mr W. D. Webber, Mr J. Lombard, Mr W. O'Brien, Mr J. R. Barry, Mr A. Smith, Mr Hill, C.E., Mr J. Ward, Mr T. A. Readwin, C.E., Mr V. Ryan, Mr G. Seagrave, Mr J. Meadows, Mr A. M'Nab, Mr T. Baldwin, Mr J. Ganly.

Alderman Purdon will be happy to receive the names of any other gentlemen who may

wish to co-operate upon the Board of the Commission, and he hopes that in the ensuing week all the necessary preliminaries will be matured for carrying out the objects of the commission.

"'Tis an ill wind blows nobody good," is

an old saying, and if the foregoing commission effect its object, as I believe it will—the utilization of our vast peat bogs—we need not be very sorry for the strikes among the English colliers.

SHAMROCK.

EARL DERBY ON LABOUR AND WAGES.

LORD DERBY presided at the annual dinner of the Bury Agricultural Society, held at Manchester, on Thursday evening, and in giving the toast of "Prosperity to the Society," he said:—He supposed the whole industrial community of the country were now in a position which had hardly any precedent, at least in recent history. We were burdened and inconvenienced by a superabundance of prosperity. Make as many deductions as we pleased for the depreciated value of money, still he apprehended that there was nothing in our recent history like the growth of trade, of manufacture, and of industry in all departments, and the consequent increase of public and private wealth which had taken place during the last six years. It was dangerous to prophesy in the face of the crisis of July, 1866, when lamentations were heard that our trade was ruined, and our industry would decline; yet our imports in 1871 were 330 millions against 271 millions in 1865, and our exports had increased in even a greater proportion; and, whereas, when he was a boy people were writing books on the duty of employing the redundant population, we were now in exactly a contrary position. Two masters were

any set of men saw their way to an extra two, three, or four shillings a week in wages, or, what was the same thing, a reduction of hours without a reduction of wages, it was not reasonable to expect them to give up their chance of securing this simply from speculative considerations, or because they were going to ruin trade in the long run, or industry in general. They would naturally do the best for themselves, and so would the masters in their place. But then came the question, was it quite certain that the power of the man would always thus continue? It was doubtful, to say the least, whether this almost unprecedented demand for labour would always continue at its present rate. He spoke with great diffidence, as his knowledge was mainly second-hand, but he believed practical men engaged in any kind of business would say it could not last, that with such a run of prosperity as during the last three or four years a reaction must follow as surely as day succeeds night, and we may be thankful if it only comes upon us slowly, and not with the ruin and the crash of 1866. We had to bear in mind, too, that in all branches of industry where we competed with foreign nations, and that was pretty nearly in every branch of industry, as things were in the present time we were giving them an advantage which they never had before. We had to say that whatever other advantages we might lose there were three that could not fail to remain, that we should still have our cheap coal, our iron, and skilled labour, which in any other country could not be equalled. Coal and iron were as plentiful now as they were certainly not cheap, nor were they likely to be for some time. And as for our skilled labour, we must not conceal from ourselves that in that respect we were being rivalled by foreign countries to a very much

greater degree than before. We could not escape from the effect of economical laws merely by ignoring and refusing to acknowledge them. If there was any truth or meaning in those laws, dear labour would lead to diminished consumption; diminished consumption would tend to check production; diminished production would in its turn cause a decrease in the demand for labour, and so, unless other influences interfered, the tendency of wages would be to fall again, he did not say to, but towards their old level. The simple explanation of the economical state of things which we saw around us was that the demand for labour in all industrial pursuits at present greatly exceeded the supply. Suppose, for argument sake, it was possible that a million or even half a million working men could be suddenly added to the population, he apprehended that in that case we would see within a few days or weeks there would be no more strikes, and no more demand for higher rates of wages. Of course, that increase of population he had supposed could not happen in a few days, or in a few months, but it was another question whether it would not take place a few years hitherto, judging by our former experience. In England high wages among the labouring populations had inevitably brought about early marriages, and, consequently, an increase in the number of births. Probably the same cause would still have the same effect. In addition to that, the tendency of greater comforts being obtained by the poorer classes at home would be to check that emigration which was now taking place to foreign countries. With the growth of those sanitary improvements which we all talked about, we would have a great diminution in the infant mortality among the working class, which mortality, at least in great towns, was at present excessive. Again, we should have, as in the United States and the colonies, an increased development of labour-saving machinery, by which one pair of hands would be enabled to do the work of two or three. We would probably have in many branches of industry increased foreign competition, and in some rural districts at least it seemed to him that advanced rates of wages were not unlikely to lead now, as they led three hundred years ago, to a considerable substitution of pasture for tillage, especially if the price of meat continued at anything like its present rate. He thought they would agree with him that it was at least uncertain whether the present condition of the labour market

could be assumed to be likely to be its permanent condition. The practical inference he drew was this, if that was a matter of doubt, those who might have or might seem to have the command of the market now in their hands would do well to use their power with moderation, and those who were now inclined to complain and to despond would do well if they thought twice before they gave up. Again, if he were talking there to agricultural labourers meditating either a strike or a demand for considerably increased rates of pay, he should try to impress upon them in their own interests that it did not necessarily follow, because they could pretty well make their own terms in harvest time, that, therefore, they would be equally able to do so in the winter months. He would remind them that they could not at the same time stand upon their extreme rights and yet ask or expect from employers things which were not a matter of bargain, but a favour. He would suggest to them that under most landlords they enjoyed advantages in the shape of cottages at half rents, gardens, of allotments, of constant employment through the winter and in bad weather, and in various other ways, all which advantages, if it came to a matter of bargain, it was open to the employer to withdraw, and all which, though it was taken by itself to be small, yet did collectively come to a very substantial addition to wages. If, on the other hand, he were addressing employers, he would tell them that, accepting as we all did the principle of competition in life, and the very essence of competition in life being that every man within certain recognised limits had a right to struggle for his own success, even at the expense of inconvenience or failure to others, that being so, they had no right to find fault or to complain with the men whom they employed for trying to better their condition. But he should go on to say, assuming it to be so, that the present demands made upon them were excessive, there were perfectly legitimate and unobjectionable ways in which those demands might be made. He perceived lately that a large number of persons in some of the northern towns, thinking the price of butchers' meat unreasonably high, had met together and agreed to abstain from the use of meat for a considerable period, unless in the meanwhile the price should have come down. He did not know whether those people kept, or were likely to keep, their engagement, but he did know that wastefulness was in pretty well all classes one of our great English faults, and that there was in almost everybody's expenditure above the very poorest class a great

deal in regard of which retrenchment was always possible, and being possible was often wise, and if a landowner or farmer were thinking just now of building a new house or carrying out a work of reclamation of waste land upon a large scale he should be inclined to advise him to employ no more men than the necessity of the business required, for the labour market must settle down one way or other in a short time. If, for instance, bread was to be at famine prices, then the richest persons would feel it incumbent upon them not to use more bread than was absolutely necessary. If labour is at a famine price let us reserve it as far as we can for necessary use; that was our undoubted right, and if exercised it will, to a great extent, break the force and lessen the violence of that movement which we are all watching with various feelings, some with feelings of fear, some with feelings of hope, but which we cannot doubt

must affect, in a very serious degree, our national interests. They must understand in what he had said to them that he was not attempting to prejudice the very large question of what agricultural wages, or any other wages, ought ultimately to be. That was a matter the decision on which did not lie under the control of any of them. It depended upon the action of great social and economical causes, which no individual could influence ultimately in a more than infinitesimal degree. But all sudden changes, whether for the better or worse, were apt to press unduly upon some classes. If this movement was not likely to be permanent, a check ought to be put upon it, if only to prevent great disappointment in the future. If it was to be permanent, then those who were affected on all sides would be none the worse for a little time and leisure to look forward for the new state of things they were about to encounter.

VIENNA UNIVERSAL EXHIBITION, 1873.

HER Majesty's Commissioners for the Vienna Universal Exhibition have obtained from the Director-General of the Imperial Austrian Commission, Baron von Schwarz-Senborn, answers to a series of questions of importance to exhibitors in reference to various details in connexion with the Exhibition, of which the following is a summary:—

As it is important to assure in time the engines and steam boilers intended to set in motion the machines exhibited in the English section of the Machinery Hall of the said Exhibition, the attention of English manufacturers is called to this opportunity to exhibit either fixed steam boilers, fixed steam engines, or portable engines, and also steam engines and steam generators for service in the Machinery Hall.

Machinery and apparatus specially adapted to the requirements of the Exhibition may also be supplied by exhibitors, as, for instance:—

Boilers for the production of steam for engines.

Steam engines for driving the main shafting in the Machinery Hall.

Gas and water-power engines, for driving single machines and groups of machines.

Large and small pumps for waterworks and fountains.

Travelling cranes with normal gauges of 1.5 metre (4 ft. 11 in. from centre to centre) for service in the Machinery Hall.

Overhead travelling cranes with winch and moving gear, with a gauge of 10.5 metres from rail to rail, for the erection of heavy pieces for the Machinery Hall.

Hydraulic lifts for raising persons.

Portable engines for the service outside the Machinery Hall.

Exhibitors supplying such machines and apparatus intended for special service during the Exhibition, will enjoy special privileges, to be arranged between them and the Director-General.

If British makers lend cranes, hoists, boilers, engines, &c., for use of British exhibitors, no fees will be levied by the Imperial Austrian Commission for the use of the same by British exhibitors. But if British exhibitors lend such machinery for the use of foreign exhibitors, arrangements will be made by the Austrian Director-General to indemnify British exhibitors for the use of their machinery.

The power required to set machinery and

main shafting for driving machinery in motion will be supplied by the Austrian Commission, and exhibitors will in no case be charged for motive power supplied by the main driving shaft in the Machinery Hall.

The moving force will be transmitted by two horizontal shafts of a diameter of 0·9 metre (about 4·39 inches), and 120 revolutions per minute is the speed rate.

The exhibitors have to supply the pulleys for the main shafts, as well as any other gear and driving bands, at their own cost.

Machinery intended to be worked will be placed in the central gallery of the Machinery Hall.

The preservation, cleaning, and oiling of the main shafts will be attended to by the Austrian General Manager, but exhibitors will have to attend to the preservation and oiling of the gear supplied by them, as also to the security of their straps.

Brickwork foundations in the Machinery Hall must be built at the cost of the exhibitors, and be finished and ready for receiving the machinery by the 15th of March, 1873; but the brick foundations and the stonework for engines and steam boilers, &c., employed for setting in motion the machines exhibited, will be constructed by the Austrian Commission according to the plans of the exhibitors.

The main lines of pipes for water, steam, and gas will also be laid by the Austrian Commission, and the exhibitor has only to supply the connecting pipes with his machines.

Coals from the best Austrian and Prussian coal mines, and feeding for boilers, &c., supplying steam engines, driving machinery in the Machinery Hall, will be supplied by the Austrian Commission free of expense. Stokers will also be provided for the steam boilers lent for service in the Exhibition, or, if the exhibitor should prefer to employ his own people, the wages of the latter will be paid by the Austrian Commission according to the fixed tariff.

Should an exhibitor wish to burn wood, he will likewise be provided with it.

The whole Exhibition ground will be drained by a system of drainage pipes carrying water and liquids to the Danube, and every measure has been taken to have a sufficient supply of water in all parts of the Exhibition.

Water will be furnished at a pressure of about 24 feet at low pressure, and about 120 feet at high pressure.

Gas will be furnished by the Imperial Continental Gas Company at the usual pressure.

Steam pressure generally at 5 atmospheres, about 70 lb. to the square inch.

Steam pressure in foreign boilers is not limited, but they will be subject to the Austrian laws and regulations.

Single boiler-houses are being erected at the rear of the Machinery Hall, about 40 feet distant; but a special boiler-house for British boilers will be built by the Austrian Commission.

Plans furnished by the British Commission for British boiler-houses, will be adopted if the British Commission will undertake the execution of the same. The erection of British boiler-houses is especially desired, in order to shew the ingenuity and workmanship of British construction.

Traction engines, locomotive steam carriages for ordinary roads, steam omnibuses, and similar kinds of self-propelling vehicles, will be allowed to run about during the Exhibition, in some parts of the Park and the Exhibition grounds. In fact, traction engines, road rollers, self-propelling steam carriages, steam omnibuses, and steam pleasure carriages will be very welcome.

There will be some work of importance to be done by steam road rollers, and, in case of any work performed for the installation by traction engines or road rollers, all expenses will be paid by the Austrian Commission.

In case of railway locomotive engines and carriages being sent to the Exhibition, the rails for them to stand upon must be provided by the exhibitors, and it is very much desired that rails from England should be sent to Vienna as exhibition articles.

There will be competitive trials with steam fire engines, and the jury and exhibitors are invited to send special engines for this purpose. Such engines will be considered as objects of exhibition, and, if lent for use, fuel and care will be at the charge of the Imperial Austrian Commission.

There will likewise be special trials held with agricultural machines and implements in fields in the neighbourhood of Vienna, or in such places as can be easily reached by the Exhibition railway.

Agricultural machines will not be exhibited in the Machinery Hall, but in a pavilion specially built for that purpose.

All machines, &c., intended for the Exhibition will be admitted to the Machinery Hall from the 1st of February till the 15th of April, 1873, inclusive, and must be set up by the 25th of April.

Machines and apparatus arriving in pieces,

and consisting of heavy and bulky parts, must be set up by the 15th of April.

Slate is particularly desired to be sent to the Exhibition; the slate will stand a chance of being sold with advantage at the close of the Exhibition, the Austrian slate being only fit for roofing.

It is also desired by the Director-General that fittings, show-cases, cloth for the covering of walls, window glass, &c., should be sent from England to Vienna; these would be considered as exhibition objects, and could be sold at the close of the Exhibition.

Considering the bad and very costly experiences of all foreign commissions at past

London and Paris Exhibitions in storing empty packing cases, the Director-General of the Austrian Commission has made special arrangements in this respect, offering every possible facility. He has secured near the exhibition-grounds a large space for "empties," which he offers gratis to the foreign commissions. On this space a modern building will be erected, and a very moderate rate charged according to a fixed tariff based upon the actual outlay of cost. It will be connected by rail with the Exhibition, so that all empties can be sent direct to this shed.

No previous Exhibition has afforded such facilities for this purpose.

Agricultural Implements and Machines.

THE PRIZE ENGINE AT CARDIFF.

DESCRIPTION of the construction and manufacture of Messrs Clayton & Shuttleworth's portable engine (which won the first prize in its class in the Cardiff) was given lately in *Engineer*. The engine, it is stated, is of a type introduced many years ago by Messrs Clayton & Shuttleworth, the cylinder, which of course, steam-jacketted all over, being lined in the upper part of the smoke-box so that the exterior of the jacket is exposed to the hot gases passing off to the chimney. This arrangement is, we consider, an excellent one, as it causes some of the heat taken up from the jacket to be supplied to the escaping products of combustion, thus obviating the intervention of the jacket between the hot gases and the cylinder proper, thereby preventing the chance of the latter being overheated so as to cause cutting. In the engine described the cylinder is lined with a thin lining, however, not being a regular lining, such as is employed by the Reading Iron Works Company, but being simply a plate bent round so that the longitudinal edges, which are planed, butt fairly together. The lining thus made is forced into the cast iron barrel of the cylinder, the lining being cast in one piece with the jacket, and is held in place by a steel bush; whereas, in the Reading Iron Works Company's arrangement, the steel bush forms the barrel of the cylinder, and is completely surrounded by the jacket. The distribution of the steam is effected by means of short slide valves with expansion on the back, these latter valves having thin bars so cast on them that each forms a guide for the other, as the space between the valves is altered by the turning of the screwed spindle. The degree of

expansion is under the control of the governor, the latter, as it rises, turning the valve spindle, and separating the two expansion slides so as to give an earlier cut off. On the expansion valve spindle is placed a small brass pulley, and round this is coiled a cord which is led off over a small guide pulley, and hangs down by the side of the engine. At the end of this cord is a disc, on which weights can be placed; these weights, by pulling on the cord, tending to turn the expansion valve spindle in such a direction as to increase the admission of steam. By altering the weights just mentioned, the engine can be adjusted to run at a certain desired speed with different loads, and the arrangement appeared to answer well at Cardiff, although the loose weights are scarcely fitted for general use.

The crank-shaft is of steel and has three bearings, the centre one being placed close to the crank. The arms of the crank were carefully fitted into two cast-iron discs carrying the balance weights, so that the shaft has the appearance of being fitted with a disc crank. This arrangement of balance weights is an excellent one, and is very well carried out. The crank-shaft plummer blocks are carried by wrought-iron brackets, these brackets being made so that they can spring freely to allow for the expansion of the boiler, while the plummer blocks are connected direct to the cylinder by tie rods as shewn, these rods taking the strains due to the working of the engine.

The feed pump, which is remarkably small, but which is a beautiful piece of work, delivers the feed into a feed-heater arranged in the smoke-box, this heater being a casing of horseshoe form, traversed from end to end

by copper pipes, through which a portion of the exhaust steam is made to pass.

The boiler—which, aided by good stoking, shewed such exceptional evaporative power during the trials—is distinguished rather by general excellence in the proportions than by any peculiar features. It is, however, provided with a steam dome, a valuable adjunct for insuring a supply of dry steam, and the fire-box is made with the portion below the fire-door completely cut away, the opening being filled in with a block of fire-clay attached to a suitable casting. This mode of constructing the fire-box has been adopted by Messrs Clayton & Shuttleworth for many of their engines for some time past, and we consider it to be one worthy of being still more extensively adopted. Amongst other advantages it does away with a part of the fire-box, which frequently gives trouble, while by removing the block of fire-clay very ready access is obtained to the interior of the fire-box.

The engine we have been describing was submitted to two trials at Cardiff, and on the first occasion it run 4 hours 51.3 min., and on the second 5 hours 1.06 min. mechanical time, with an allowance of 14 lb. of coal per dynametrical horse power; these performances corresponding to a consumption of 2.88 lb. and 2.79 lb. of coal respectively per dynametrical horse power per hour. During the first trial the boiler evaporated 11.39 lb., and during the second run 11.32 lb. of water per pound of coal; these rates of evaporation being by far the highest of which we have ever heard being attained by a portable engine boiler. The whole performance of the engine was

very satisfactory, and the engine was found to be capable of running at a speed of 100 revolutions per minute, with an allowance of 14 lb. of coal per dynametrical horse power, and of evaporating 11.32 lb. of water per pound of coal. The engine was also found to be capable of running at a speed of 100 revolutions per minute, with an allowance of 14 lb. of coal per dynametrical horse power, and of evaporating 11.32 lb. of water per pound of coal. The engine was also found to be capable of running at a speed of 100 revolutions per minute, with an allowance of 14 lb. of coal per dynametrical horse power, and of evaporating 11.32 lb. of water per pound of coal.

convenience of reference we repeat it here, and we also append an abstract of results obtained during the second concluding trial.

| | ft. in |
|---|--------------|
| Diameter of cylinder | 0 9 |
| Stroke | 1 0 |
| Length of fire-box inside | 2 2 |
| Width „ „ | 2 5 |
| Height „ „ above firebars | 2 6 |
| Number of tubes | 56 |
| Length „ „ | 6 0 |
| Diameter of tubes outside | 0 2 |
| Area of firegrate as used on trial | 3.13 s |
| Aggregate area of spaces between firebars as used on trial | 1.19 s |
| Heating surface : Tubes (outside) | 192. sq. ft. |
| „ „ Fire-box | 25.12 sq. |
| Total | 227.12 |

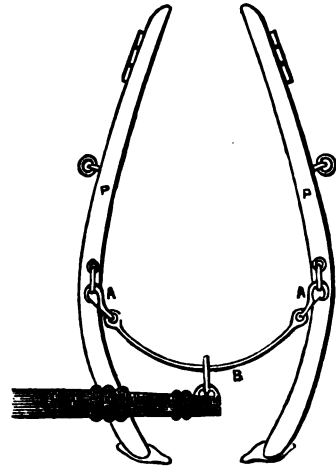
| | |
|--|--------------|
| Diameter of blast nozzle | 0 2 |
| Nominal speed in revolutions per minute | 110 n |
| Mean speed in revolutions per minute during trial | 112.64 |
| Mean piston speed in feet per minute | 225.58 |
| Load on brake | 14 H |
| Actual time run with allowance of 14 lb. of coal per dynametrical horse power | 4 h. 54 |
| Mechanical time = total number of revolutions ÷ nominal speed | 5 h. 14 |
| Consumption of coal per dynametrical horse power per hour | 2.79 l |
| Consumption of water per dynametrical horse power per hour | 31.71 |
| Water evaporated per pound of coal | 11.32 |
| Coal consumed per square foot of firegrate per hour | 12.48 |
| Temperature of gases in smoke-box | 390° to 415° |
| Temperature of feed | 210° |

It should be borne in mind that the quantity of water given above as being consumed per dynametrical horse power per hour, and the quantity of water evaporated per pound of coal, are both figures arising from the condensation of the steam in the jacket, which is, of course, continually drained from the boiler and being re-evaporated. It is being possible to take an account of the evaporative power of the boiler, more, really higher than what is shown by the above figures.

IMPROVEMENTS IN BREAST-STRAP FOR HORSES.

THE breast-strap of harness is subject to great strain in backing the vehicle, or the holding back of the vehicle when descending a declivity; consequently, when this important portion of a harness is constructed of leather, it soon gives way, even when used only in the prosecution of the routine of farm operations. There are numerous patented appliances for the preservation of the breast-strap; but they protect them at but one point, viz., where the neck-yoke ring presses against the strap. Taken as a whole, it is a bungling, uncouth affair, a combination of leather, snaps, buckles, rings, &c., which is not desirable, as simplicity is above all a desideratum. In the accompanying illustration is shewn an arrangement for breast-strap that reduces the whole affair to the simplest possible form consistent with strength and convenience; it is, however, open to one objection—it being of iron, the neck-yoke ring, when driving fast, or over a rough road, makes a jingling and not unmusical sound, Snap A, A, are secured to the near plate of

circle B by welding; it is easily detached from the hames P, P. If made of good iron



Improvement in Breast-Strap for Harness.

it will outlast three pair of hames. The manner of using it is clearly shewn in the figure.

The Farm.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

THE Trade and Navigation Accounts for the month and eight months ended August, show a considerable falling off in the imports of live stock in both periods, but more conspicuously so in the extended term. Taking oxen, bulls and cows together, we find that in the first two-thirds of this year, we received only 91,549 as against 127,935 in the corresponding term of last. For this year's imports, so far, we have disbursed £1,653,585, which is at the rate of £18, 1s. per head; last year in the like period we expended £2,087,468, or about £16, 6s. per head, so that the value of every beast has been enhanced £1, 15s. in the course of the year. No doubt the superior quality of the beasts, particularly in the case of those coming from Oporto, has a good deal to do with the rise, but still prices have risen *per se* very considerably. In the course of the eight months the receipts of calves diminished from 29,874 to 27,129, and the money we paid for them this year was £91,454 as against £103,739 in the corresponding period of last. The decrease in sheep amounts to upwards of 23,000 head, the figures for 1871 being 595,867 and up to the end of last August 572,482. But the decrease in numbers brought enhanced prices, as we actually paid more this year than last, viz., £1,122,200

as against £914,549 in the corresponding

period of last year.

The receipts of pigs have also

diminished, the figures for 1871 being

1,122,200 and up to the end of last

August 1,122,200. But the decrease in

numbers brought enhanced prices, as we

actually paid more this year than last,

viz., £1,122,200 as against £914,549

in the corresponding period of last

year.

end of August this year was £2,921,116; last year in the same period we expended £3,519,920.

We have imported no less than 97,200 cwt. of bacon during the month, which amount to compare with the corresponding period of 1871 and the preceding year, shews a steady increase. During the eight months of the year which have passed, our consignments of this article from abroad cost us £2,946,132, as against £1,702,786, which we paid in the like term of 1871. For beef, salted or fresh, or slightly salted, we are debited with £12,220 during August, which set against the same month of last year, exhibits an increase of over £2000. On the longer period of the present year, however, there is a marked falling off in the amount paid in comparison with that disbursed in 1871, the figures being £293,927 and £464,803. Of meat unenumerated in either of the headings mentioned, our supplies have been considerably augmented during the month, while in the eight months we paid £639,841, as against £405,637 in the longer period of last year. It is pleasing to remark that this increased supply is chiefly made up by the excellent preserved meat which we receive from our Australian colonies. The total amount we have expended during the past eight months for pork, salted or fresh beef and preserved or salted beef and mutton, was £1,170,000, while in the same eight months of 1871 the disbursement was £1,371,260.

Our receipts of pork during the past month amounted to 6,244 cwt., a somewhat lighter quantity than that of August, 1871. It would appear that we are becoming less dependent upon the foreigner for our pork, inasmuch as

im we have paid out since the opening year—£361,706—is less by £211,742 the expenditure under this head in the corresponding period of last year.

The amounts set against poultry and game received from abroad still continue much more than could be wished for. In August we paid £6,462, an increase of £1,423 on the sum we were debited with in the same month of last year. Under this head we paid £88,567 in the longer term, while in the first eight months of 1871 £70,908 is the recorded amount.

Our supply of foreign eggs seems to be larger and larger every month. Last month we imported 341,451, “great hun-,” which is a perceptible increase on the number in the same month of last year. Since the opening of the present year we have been in receipt of 3,540,890 “great reds,” costing us £1,377,953. The sum paid last year in the like period was £887,887. Butter has fallen off slightly in the month, while on the other hand cheese has increased in bulk in about the same ratio. In the eight months, putting both commodities together, we have paid £5,748,598, as in the same period of 1871 the total paid was £6,556,944. Altogether for dairy produce we have disbursed £7,126,551 to the grain farmers for the last eight months, the sum paid up to the end of August last year amounting to £7,344,831.

Wheat in the month and longer term our imports of corn from abroad have been fewer as compared with either period last year.

Barley, during August, came to hand in smaller quantities, but the figures set against the eight months of this year are nearly equal to those recorded up to the end of the month in 1871. Oats, likewise, have fallen in the month, but in the long period there is more than a million cwt. this year in excess of last year's supply. Peas have appreciably increased both in the month and in the eight months, while beans are shorter in the month, but show an augmentation since the beginning of the year. Indian corn or maize has been heavier in bulk in both periods, but the importations of wheat, meal, and flour have

declined both in the month and eight months. Since the opening of the present year our importations of grain have amounted to a money value of £28,575,103; while from January to the end of August in 1871 the total was £25,407,760.

The following tables give the quantities of the several kinds of cereals, &c., the names of the countries from which they were imported, and the values for the past eight months as compared with the corresponding period of last year:—

| QUANTITIES. | | |
|--|-------------------------------------|-------------------------------------|
| | Eight Months ended August 31, 1871. | Eight Months ended August 31, 1872. |
| Wheat. | Cwt. | Cwt. |
| Russia..... | 9,068,527 | 11,468,766 |
| Denmark | 51,933 | 128,832 |
| Germany | 1,972,929 | 2,272,093 |
| France | 74,003 | 333,123 |
| Austrian Territories ... | 227,704 | 41,962 |
| Turkey, Wallachia, } and Moldavia | 1,198,094 | 661,264 |
| Egypt..... | 257,583 | 1,582,352 |
| United States | 8,275,863 | 4,372,168 |
| Chili | 291,361 | 1,000,454 |
| British North America | 1,610,514 | 456,019 |
| Other Countries | 468,356 | 843,178 |
| Total..... | 23,496,867 | 23,160,211 |
| VALUE. | | |
| Russia..... | £5,142,170 | £6,663,088 |
| Denmark | 32,286 | 84,949 |
| Germany | 1,296,404 | 1,512,169 |
| France | 37,787 | 207,653 |
| Austrian Territories ... | 145,485 | 25,074 |
| Turkey, Wallachia, } and Moldavia | 620,858 | 353,676 |
| Egypt..... | 137,385 | 786,341 |
| United States | 4,935,640 | 2,816,375 |
| Chili | 186,110 | 649,131 |
| British North America | 926,245 | 295,244 |
| Other Countries | 284,570 | 557,903 |
| Total | £13,744,940 | £13,951,603 |

| QUANTITIES. | | |
|---------------------------|-------------------------------------|-------------------------------------|
| | Eight Months ended August 31, 1871. | Eight Months ended August 31, 1872. |
| | Cwt. | Cwt. |
| Barley..... | 4,830,462 | 8,347,612 |
| Oats | 6,837,534 | 7,920,361 |
| Peas | 638,403 | 702,818 |
| Beans | 1,678,129 | 2,012,299 |
| Indian Corn or Maize..... | 9,616,218 | 15,490,384 |

| VALUE. | | |
|------------------------------|---|---|
| Barley..... | £1,884,269 | £3,205,631 |
| Oats | 2,642,569 | 2,867,000 |
| Peas | 280,224 | 298,492 |
| Beans | 737,679 | 801,211 |
| Indian Corn or Maize..... | 3,702,884 | 5,530,183 |
| QUANTITIES. | | |
| | Eight Months ended August 31, 1871. | Eight Months ended August 31, 1872. |
| Wheat Meal, and Flour. Cwt. | | Cwt. |
| Germany | 604,008 | 619,815 |
| France | 12,050 | 369,682 |
| United States | 1,422,063 | 301,240 |
| British North America | 196,365 | 164,491 |
| Other Countries | 559,790 | 606,729 |
| Total | 2,794,276 | 2,061,957 |
| VALUE. | | |
| Germany | £563,374 | £569,923 |
| France | 10,964 | 343,024 |
| United States | 1,153,877 | 239,437 |
| British North America | 145,080 | 143,075 |
| Other Countries | 541,900 | 615,524 |
| Total | £2,415,195 | £1,910,983 |

As regards manurial substances, we notice an augmented importation of guano last month in comparison with the corresponding period of last year, the respective amounts being 10,360 and 6225 tons. During the eight months, however, we have received only about half the supply we did last year; and the cost of this year's receipts came to £737,455, while those of the preceding year were valued at £1,691,654. As a fertilizer bones seem to be gaining favour among farmers, the importations from abroad, both during the long and short period this year being in excess of the last. We have imported £41,000 worth of bones during the eight months, compared with £10,000 worth in the corresponding period of last year.

The importations of guano, however, have been of an extraordinary character. Butter and cheese have shown a falling-off both in the short and long periods, our money receipts for both since the beginning of the year being £243,282, to compare with £273,014 in the corresponding period of 1871.

fact is observable. Since January our foreign supplies of this root have taken £364,470 out of our pockets, while last year in the same period we only spent £125,521 under this head.

Oil-seed cake seems to be falling off, as in both periods our receipts have been shorter this year than last. Cotton-seed, on the other hand, has increased both in the month and eight months, the price paid for this commodity during the latter term being £1,232,948, as compared with £1,195,770 in 1871. Rape-seed has decreased considerably, both on the month and eight months.

Coming to wool, we note an appreciable falling off in our importations during the month, principally in our European supply. On the eight months there have been lighter arrivals also, as will be seen from the following tables, which shew the countries from whence they come and the quantities and values since January last:—

| QUANTITIES. | | |
|-----------------------------|---|---|
| | Eight Months ended August 31, 1871. | Eight Months ended August 31, 1872. |
| Wool, Sheep, and Lambs. lb. | | lb. |
| From Countries in Europe | 28,309,970 | 25,323,764 |
| „ British Possessions | | |
| in South Africa ... | 22,382,608 | 21,657,149 |
| „ British India | 15,452,827 | 15,295,177 |
| „ Australia..... | 168,428,955 | 161,641,453 |
| „ Other Countries..... | 22,199,177 | 26,732,470 |
| Total..... | 256,773,537 | 250,650,013 |
| VALUE. | | |
| From Countries in Europe | £1,520,983 | £1,451,573 |
| „ British Possessions | | |
| in South Africa ... | 1,158,719 | 1,395,211 |
| „ British India | 534,859 | 677,068 |
| „ Australia | 9,847,941 | 10,067,018 |
| „ Other Countries..... | 814,143 | 1,274,933 |
| Total | £13,876,645 | £14,865,803 |

The agricultural commodities imported during the month have been of an extraordinary character. Butter and cheese have shown a falling-off both in the short and long periods, our money receipts for both since the beginning of the year being £243,282, to compare with £273,014 in the corresponding period of 1871.

During August we only exported 322 £121,487, or about an average of £54 per horse. Last year, up to the 31st of August we exported 5764 specimens of the equine breed, for which were paid £212,102, or an average price of about £36 per head.

Since January we have exported 2210 these animals, for which we received

WHEAT CULTURE.

UNDER this heading the *Albany Cultivator and Country Gentleman* publishes the following remarks from a well-known American agriculturist, Mr. W. H. White, of Connecticut :—

Perhaps there is no one product of the soil that is more nearly related to domestic economy and a nation's finances, which is the nation's prosperity and well-being to an equal extent, as the influence exerted by this single crop, whether short or a sturdier one ; for upon it, to a large extent, the people of all civilized nations depend for their bread. Its importance then is such that people should place it high in the scale of culture and improvement with all agriculturists ; it is the fact, in this respect, in all the best-growing sections of the United States? Every individual agriculturist answer, and ask himself—Do I do my best, or am I trying to improve the quality and product on my own farm? All improvement in this line must devolve upon individual effort ; advice and theory are good, so far as they go, but a ounce of practice will weigh down a pound of the former ; yet without them there will often be failure in practice ; the two must establish fact and science.

Various varieties of plants have an appropriate adaptation to the natural soil and climate, in which they will grow best ; yet many of them are endowed with a flexibility of structure to such an extent that their natural element may be changed or increased by culture. The wheat, though culture, has given us a great number of varieties, some best adapted to one soil and climate, some to another, yet each possessing the quality or power of adapting

itself, by culture, to a widely different soil, &c. ; yet in our selection of seed for sowing, reference should be made to the soil on which it grew, as also the soil on which it is to be sown, as any radical change affects the product materially, and to this cause often may be ascribed the reason of failure or partial failure of a variety to succeed in a new locality.

When our country was new, with a virgin soil, wheat succeeded in a large portion of it ; yet, after the lapse of years, its culture ceased to be a paying one ; why this deterioration in the yield and quality? The question is frequently asked and as often answered, in theory at least. Wheat is a grain composed of certain elements which it draws from the soil ; the soil, of course, must hold these elements in proportion, and in such a state as to yield them readily to the growing crop, and at the proper stage, or it will vary in quality as well as in the proportion of its elements. If the soil contains all the requisite elements, and a crop is taken from that soil, it stands to reason that that soil has lost a portion of its elements, and in order again to produce an equally good crop there must be some return made thereto, although there may be such a thing, if good culture, otherwise, is given, that several crops may be taken from some soils without any perceptible deterioration ; yet still the fact remains that if something is taken from something *less* remains ; now if that something is returned to the soil there can be no deterioration from that cause.

There are one or two leading principles which should be adopted by all wheat

culturists, which I will here briefly refer to ; and first, I would allude to seed and its preparation for sowing. All seed should be thoroughly ripe, and of selected quality, grown expressly for seed, carefully threshed and cleaned, all lighter and imperfect grains thrown out. You may say this is a big job where a large area is to be sown, requiring a large amount of seed ; I am perfectly well aware of this fact, but it is no more proportionally than for the less area and the importance of the crop demands. This selected seed should, just previous to sowing, be washed in salt water strong enough to bear up a potato—drained and dried off in dry slaked lime. In washing, all light seed and all impurities should be skimmed off. The importance of this careful preparation will be evident in the cropped product. The next and last item, which should properly come first, is ploughing and preparing the ground for sowing. The importance of *thorough* ploughing and fining the soil for the seed is seldom fully realized, and

less frequently practised. The soil cannot impart to the growing plant its nutriment unless it is unlocked ; and the key to this unlocking is pulverization of the soil through ploughing, &c. Of equal importance is it that the soil should be broken up deep down in the subsoil, that neither drought nor wet may affect it as it would were the soil less open ; neither will the frosts of winter be so destructive because of the heaving of the soil to throw out the plants. Another advantage in thorough ploughing is, that the roots of the plants can freely spread themselves, and nourishment is freely imparted to them, a more rapid and early growth ensues, while insects and other enemies have their destructiveness thwarted by the plant's superior rapidity and strength of growth, getting ahead of their season of greatest destructiveness. A little attention to the main hints in this article by the great class of wheat-growers would make an immense difference in the aggregate product of this great cereal.

WILD OATS.

THERE can be little difficulty in recognising, under the signature of "J. B.," the fine Roman hand of Professor Buckman, upon the subject of "Wild Oats." They are, as we all know, easily sown, but when once they take root in the land, rather difficult to get rid of. Yet out of these wild oats or their consanguineous neighbours have sprung forth under careful cultivation excellent food for man and beast.

In *Bell's Messenger* a correspondent writes :—
 "I have a large tract of land where these pests [wild oats] are very numerous. He gives his opinion on the best mode of getting rid of them, and also on the use of the luxuriant growth which they produce in the autumn, which is very good for stock."—
 "The following is the substance of his remarks :—
 "The first thing to be done is to get the land as free as possible from these pests that are

everywhere growing this season leads me to ask if any of your readers can account for it, or, how it happens that after land has been cultivated beyond its usual depth, either by horse or steam power, wild oats always appear to come more thickly than before. But the most important question remains—how are these pests to be got rid of?

The reply to this by "J. B." is as follows :—

Our correspondent has here directed attention to a weed plant, which during the late autumn seasons has been very much on the increase. Last year we had frequent inquiries about its nature and habits, and this season a variety is everywhere expressed about it, which in moist summers grows to the height and size that it usually does in dry ones.

We have before us three plants from our own wheat field, with culms an inch in

ference and of the following height :—

| | |
|---|---------|
| | ft. in. |
| length from the root to the last flower | 8 0 |
| ditto ditto | 7 7 |
| ditto ditto | 7 5 |
| | <hr/> |
| | 23 0 |
| | <hr/> |
| Average..... | 7 8 |

These specimens present the following
gained numbers of seeds :—

| | |
|----------------------------------|-------|
| seeds in a single wild oat | 470 |
| ditto ditto | 296 |
| ditto ditto | 260 |
| | <hr/> |
| | 1026 |
| | <hr/> |
| Average..... | 342 |

a crop of potato oats ; which is this very fine, we have specimens of equal sions, and both on this and the neighbouring farms may be seen gigantic specimens wild oat towering above the corn crops. As a humid season is favourable to it crop, so it favours the growth of the oat, and hence the reason why this latter made itself particularly conspicuous ; the last two years. In as far as our rations go, it is always present, but it would appear that, as a favourable season enters its growth, and the development of seeds, so the plant excites an unusual degree of observation, while it furnishes the elements of its increase in an augmented

own acquaintance with this plant was made in Worcestershire, when on a visit to a former friend. Our way to church was through a field of beans, where, seeing this grass towering above the bean crop, we secured a specimen, which was duly deposited in our hat, which has often served as a botanical *vasculum*. On coming from church we were seriously taken to task by a farmer as follows : " Friend, friend, what good of your going to church if you leave your wild oats behind you ? " This episode served to fix the remembrance of the plant upon the memory, as also the time when it is most prevalent, for when-

ever we have been among grasses, wild oats has been a favourite species for observation, as they occur on the mud flats or warp lands of the older estuarine conditions of the Severn in Gloucestershire, or on the rich lias and new red marls of Worcestershire. On the sandy loams of the polders of Dorset, it is wonderfully uniform in aspect, with only the difference that it is usually larger in moist than in dry seasons.

The plant under review is known to botanists under the name of *Avena fatua*, which means the silly, simple, foolish, or wild oat, by which latter name, and that of "Haver," it is recognized in the country. This name is from the Saxon, derived through the German word of "Hafer," oats, and "Haver" means in the north to talk nonsense, and, as applied to the oat, means foolish or useless oat.

This wild oat then is a truly agrarian weed, only tracking arable cultivation ; and very early, indeed, our observations upon it led to the conclusion that it was a degenerate oat. Farmers had always held the notion that it was dangerous to grow oats in some places, as they left behind a plague of wild oats. We therefore concluded that, if this were so, by careful cultivation and selection, the wild oat would be advanced to a crop oat, and our experiments conducted for a few years convinced us of the truth of this theory ; and subsequent examinations of oats gone wild on the one hand, and a crop so poor as to be next to wild on the other, soon convinced us that while the *A. fatua* may be advanced to the *A. sativa* or cultivated oat, the latter by degeneration may be converted into *A. fatua* wild oat. It would, however, make this article too long to enter into a description of all our experiments upon this subject, and besides, it could hardly be made intelligible without drawings, we must then address our remarks to our correspondent's more particular questions.

1st. "How does it happen that after land has been cultivated beyond its usual depth wild oats always appear to come more thickly than before ?"

2d. "How are these pests to be got rid of ?"

1. Whatever tends to the fertility of the crop, be it wheat, or beans—and deep ploughing usually does so—will also encourage the growth of the oat; and inasmuch as the seeds of this pest ripen and are sown before the proper crop is gathered, ample provision is made for its growth on a future occasion.

We recollect once going with a rector over some glebe lands, which were let out in small holdings, when he stopped at a patch of oats all of which had shed their seed, upon which the worthy clergyman was so vexed with the tenant for neglecting to gather his crop that he threatened to take the land from him. However we were obliged to tell him that the crop was wheat which had been smothered out by the wild oats and was still unripe. This will give the reader a notion of how this pest sometimes prevails.

It will be seen from our calculations how freely this plant seeds, and as the seeds are usually all fertile, there can be no doubt as to how the weed is constantly being reproduced; nor is there reason to suppose that the soil to any depth is charged with seeds that have lain dormant for any great length of time.

Still we have seen it come up in such quantity as at first to lead to the supposition in some farmers' minds that "the earth had bred it." In a crop of beans we once saw it so thick as to have excited the curiosity of all the farmers near, and upon inquiry it was found that the manure which had been em-

ployed for the beans consisted of—besides common dung—the sweepings of the yards, and as the wheat crop of the farm was always affected by the wild oat, and no cavings or chaff were burnt, its spread in the manure is sufficiently accounted for.

2. The above remarks point most clearly to the methods to be adopted in getting rid of the pest we have been describing—

Never sow its seed in Manures.

If it come up never let it ripen seed.

Crops in which it occurs should be hoed; this will destroy it when between the rows, and if it cannot be otherwise removed in the rows handpicking will be advisable. We had this year sown our wheat in rows, 10 inches apart, for the purpose of horse-hoeing, but the constant rains of spring made hoeing impossible. Still, this may be well effected in most seasons.

Our wheat crop is very good, but as we have seen here and there a wild oat plant lifting its head about the wheat, we have handpicked it before the ripening of its seeds; by this means we feel sure that we shall scotch our enemy for some time, and by attending to the *dicta* as above we hope soon to eradicate it altogether. But the often-quoted maxim

"One year's seeding
Is seven years' weeding,"

must here be borne in mind, as we are even now suffering for the aforesaid seeding of this weed.

AN ESTIMATE OF THE CROPS.

MR JAMES SANDERSON has given his usual annual estimate to the *Times* of the crops, and with the usual elaborate figures about rain-fall, copied from the observations of a gentleman at Clifton. We cannot say that we agree in all his remarks. We do not believe from our own observations over many parts of England and Wales, and Scotland, that the wheat crop is a fifth under average, as he declares it is. Our own opinion is, that it is short in the straw, and that the quality of the grain may not be so excellent as we have seen it, but that, on the threshing floor, it will not yield much less than average. Neither, so far as our own observations have extended, (and we have been through the counties which Mr Sanderson has surveyed) is there such a deficiency as he reports in barley. Instead of being 10 per cent. under we have thought that over the whole country it will be quite an average crop. We agree with him that on the whole the oat crop is fully above the average, but at the same time that there are many fields in various parts of the country very deficient both in straw and ears.

With his observations upon the leguminous crops we entirely coincide. We never saw better [crops of beans all over the country from the west of England to the south of Wales, and the east and middle of Scotland, than we have seen this year. Peas also in all parts of the country where they are grown have plenty of straw and are well podded.

It is agreeable also to be at one with Mr Sanderson in his remarks that the potato crop was very luxuriant up to the middle of last month. Perhaps the reporter might have said about the beginning of July, since which time sad havoc indeed has been wrought upon the tubers. In no year within our memory since 1845, has so much damage been done to potatoes in the same space of time.

It is interesting to note that the weather

of that year, whose disastrous influence was the means of conferring a great boon upon the consuming community by convincing Sir Robert Peel that the Corn Laws ought to be repealed, was of a precisely similar character to that we have experienced this year. A writer to the *Times*, Mr Langhorne, has compared the meteorological tables of this year with those of 1845, and his remarks thereon are that "it is curious to observe how in both instances heavy thunderstorms prevailed. This," he adds, "has, perhaps, been already noticed by scientific men; but as I have nowhere seen any connection surmised between the extraordinary electrical condition of the atmosphere which characterized the summer of 1845 and the present summer with the potato disease, I have thought it worth while to make a note of the circumstance for others more fully to investigate."

The facts mentioned by Mr Langhorne have been observed by others, but we are none the less thankful for cumulative evidence. So virulent is the disease in Lincolnshire that we are told by Mr John Algernon Clarke, in the *Times*, that Lincolnshire farmers will lose from £15 to £20 per acre by the crop and that over the whole country the loss will amount to something like thirty million sterling, which seems rather an exaggerated amount, although the statement receives confirmation from a London gentleman on the strength of letters from Ireland. In our topic department we give a description as to how to utilize diseased tubers, from the pen of Dr Hooker, of Kew Gardens.

And now, to return to Mr Sanderson. We cannot agree with him that "the root crops" (meaning, we presume, turnips and mangolds, potatoes having been mentioned before) are everywhere good. Our own observations are to the effect that they are extremely abundant and healthy in some places, and that neither second nor third sowings give token of anything but useless expense; in others,

so luxuriant as this year—we are sorry to say that it has been sadly deteriorated by the rains of a month ago—and the plentifulness of growth on pastures has been such that graziers could not take advantage of it on account of the exceedingly great want of stock.

By WILLIAM DEAN, Frimley, Surrey.

tuber ; more science or system as to rotation of this and other crops ; less science of the starch-grating or beanstalk kind, which would upset crop rotation, and trust to no crops but more cattle, and to potatoes got out of any worthless patch at haphazard. The potato rather, in a physiological sense, requires as nice soil and management as a tulip bulb. We know what a half-boiled bulb of a tulip would turn out ; so of our present scrofulous potato plants or 'sets.'"

The very early kinds of kidney potatoes have, to a great extent, escaped the disease; and, although seed of these will be scarce next spring, still there will be a moderate supply. Of the later kinds, on which we depend for our supplies from September until May next, the stock is so extremely limited that the demand will be in excess of the supply, and seed must be scarce and dear for next year's use. It, therefore, behoves us all to be very careful, and waste nothing which is sound; saving from the pig tubs even the small sound tubers which generally find their way there, and carefully storing them for seed in case of necessity.

Careful storing for seed is a subject of deep importance, on which I desire to say a few words. In many districts of Yorkshire, Lancashire, and other counties, especially where coal-burners exist, cottagers, as a rule, seldom save a few seed potatoes, which they store in shallow boxes, with one end of the boxes upwards; and these are exposed to the air or kept in some cool place, but preserved

rost. These are allowed to "sprout" in the spring, and are planted with sturdy shoots attached to them. This is also adopted in many private gardens, especially when there is accommodation in form of sheds, spare shelves in the fruit room or under a dry stage of a greenhouse. It is not so easy for farmers who plant systematically to adopt this plan, but it is a matter for their consideration whether it is worth not paying them to give their earnest attention to this subject. The present system of growing seed potatoes in pits is a fatal mistake if they are allowed to remain there after the end of January, or early in February, and have been one of the chief causes of the losses attending the potato crop. I will take, as an instance, the winter and spring of this year, when the weather was very mild generally, and potatoes grew very early in the pits. In a great number of the potatoes had sprouted so much that sprouts were torn away from the tubers, not only once, and in some instances more than once. The same thing occurred when large quantities of potatoes were stored in sheds under cover; this sweating and premature formation of sprouts, and their decay, tending to weaken the constitution of the tuber, and causing the "blindness" which we often meet with in fields and gardens. I know of instances when sound potatoes encountered this treatment, and some of those, sold for seed to growers, resulting in from 25 to 40 per cent of "blindness;" that is, failure of the tubers to reproduce itself. I maintain that the storage of our seed potatoes is a question of very great importance; and, in my opinion, we may trace to the improper storage of seed tubers one of the causes why the disease has made so much headway. It has been going on year after year, and is a mistake. Growers on an extensive scale may ask—how are we to store seed for a large quantity of ground, if we adopt this plan? I think that difficulty is easily overcome, as there are several means for effectually storing seed potatoes which present themselves, such as utilizing

spare space in out-buildings, or the erection of potato-seed sheds, which can be readily done by using fern, heather, sods, or any available materials for the sides, and thatching the roof with straw, reeds, heath, or any waste material, and putting in here and there an old sash for light and ventilation; of course having doors at the ends also for thorough ventilation. One thing is a certainty: it is as much to our interest to look after our potato crops and prevent disease as it is to expensively house our cattle and prevent disease in them; and it behoves us to be up and doing, and to set our brains to work on what is best to be done.

Another primary cause of failure is to be found in the persistency with which, in so many cases, we plant potatoes year after year in the same ground; in other cases, with only a short interval between the crops of this tuber. We go on year after year manuring for the same purpose, but never supplying the best of all the manures nature has given us—a change of good fresh unused soil. Farmers have it in their power to do this, and probably do change their potato land frequently. There can be no question about the advisability of *deep digging* or *deep ploughing* for this crop, in dry situations as well as wet, but especially in the latter. It is most desirable that the potato should be relieved from a superabundance of moisture; hence the necessity for providing every available means of relieving the ground as speedily as possible from an excess of moisture. I have a strong conviction that unless this is done, the potato, when just about arriving at maturity, is unable to take up such a great amount of moisture at the root, and that rapid root decay sets in. Does this root-decay pass to the tuber, and through the cellular tissues of the haulm to the foliage, where it manifests itself in the spot so familiar to us? I venture to think so, and that disease springs first from a disorganization of the roots, arising from too much moisture there at the period I speak of. I have founded this impression on observing for years past that the disease does not make headway, only after much wet,

followed by close moist weather. I, therefore, regard drainage as imperative ; and the drier the surface can be kept, and the more air and light that can be admitted, so much the better.

My object in penning these remarks is not to attempt teaching farmers a lesson as to planting and after culture, as they are thinking men. I appeal more to cottagers and small growers, who have but limited ground ; and to these I would say, add to your potato grounds every year all that you can get hold of in parings from the road side, and from hedges, and any sods of good soil you can obtain hold of. Burn all your coarse weeds, clippings of hedges, rough bits of turf ; in fact any waste material you can get hold of and apply the ashes to your land. You cannot go wrong in this ; or the addition of any wood ashes ; and fires in some out-of-the-way place can be kept going. It is far better to burn your weeds before they seed than to allow them to seed, as you gain in vital power to your land, as well as in a saving of labour to yourselves. Do this : store your seed carefully, plant early and not too close, and if very wet weather sets in and produces disease, thin out a good bit of the

haulm to admit light and air. Keep the ground hoed and clear of weeds, and I think you will do much towards arresting the violence of the disease. One more hint, and it is this : as soon as the potatoes are dug, let the ground be instantly thrown up in high ridges, and let this operation be frequently repeated during the winter. By this means the ground will become sweeter, and more fitting for the reception of the crops by the action of the frost and air on the soil.

Profitable cottage gardening is a subject which the clergymen of this country should take in hand and teach their parishioners. The cottage gardens of the country districts are too often plots of neglected ground, and by means of pamphlets containing hints, and by advice, a great deal of good can be done. Profitable cottage cookery is another subject I would suggest should also be taken in hand, by the clergy and their wives teaching our poorer cottagers how to utilize vegetables in the form of nutritious soups and broths, as they do in Scotland and on the Continent, where vegetables are of more importance than meat. We are lamentably ignorant in this country of the multitudinous uses to which vegetables can be adapted.

IRRIGATING PASTURE LAND.

By DR HOPKINS.*

ARTIFICIAL irrigation consists in conducting water from some natural source of supply, such as rivers, springs, or the like, by means of channels or ditches, to the land which is to be irrigated. The object of irrigation is to supply the land with water, and to keep it moist, so that the crops may grow well. The most common method of irrigation is by means of canals or ditches, which are dug from a natural source of water to the land. The water is then conducted through these channels to the land, and is used to water the crops. This method is simple and easy to understand, and is the most common one in use. There are, however, other methods of irrigation, such as the use of pumps or the use of underground passages, which are more complicated and expensive. The choice of method depends on the circumstances of the land and the crops to be irrigated.

of water, for which minor channels are led off for the purpose of distributing the water to the various fields or divisions of lands. Where existing lakes are found, the process of leading off the water in canals is simple enough, but artificial reservoirs are often constructed by damming up a gorge in a range of hills, from which is collected and stored all the water draining into it ; and where rock strata, as a practice prevails in some parts of the world, of excavating a subterraneous passage, having the usual slope of an irrigation canal, in the direction where water is supposed to exist. Time will not permit me to enter

into the elevation, climate, and character of the district, or the direction, slope, or extent of its various parts, involving by the diminution of heat, dryness of air, and scarcity of those substances which are produced by the decomposition of organic matters in high places, the rains, as well as the waters of the springs dissolving and washing off as they run away to the valleys, which renders the poor uplands gradually poorer to the lower in some degree, but not to the extent of the loss to the uplands; the saving, therefore, of the water from springs, rivers, and rains constitutes the art of irrigation.

This art, which is of great antiquity in all known countries, instead of being further developed, has everywhere been more or less neglected, with the exception of Switzerland, entailing an enormous loss upon the inhabitants, and gradual deterioration of high lands already suffering from thinness of soil and its accompanying aridity.

IRRIGATING GRASS LAND IN HILLY DISTRICTS.

Unfortunately, the hilly parts with which we are surrounded are by climate and position rendered inferior to other more favoured regions, the herbage being more scant than in low place or valley, which entails upon the number of both consequent and accompanying disadvantages. Its grass lands produce a less succulent and nourishing herbage, the crops are slower in reproduction, and earlier withered in the autumn. Its cereal crops produce less plump grain, run more to straw, are slower in ripening, and more liable to accidents. Its soils are more seriously washed away by heavy rains, and more deprived of the finest particles after every process of ploughing and pulverization. Its facilities of obtaining extraneous manures are much less; and its obstacles to every description of horse and steam labour more numerous and stubborn. Its lands are colder, more deficient of argillaceous and calcareous elements, more gritty, gravelly, and stony, less fitted in both mineralogical and mechanical condition for producing wheat and the other valuable grains. On such lands in high and occasionally humid situa-

tions the principal objects ought to be good grass for pasture and the ample supply of winter food for live stock; and the attainment of these objects ought to be sought by the improvement of grass lands, the wise management of hay meadows, and the cultivation of lands fit for producing turnips and other green crops for cattle. In aid of these objects, I consider irrigation a most valuable and rarely failing adjunct in this country, and one which, if practised where practicable, will be found as profitable in high and sloping grounds as draining ever has been in wet and impervious soils. The methods adopted in India, Arabia, France, Peru, China, Spain, Italy, and at a still earlier date in Africa, have been conducted since the age of the earliest histories of those countries, and have been conducted on the most extensive scale by means of diverting rivers by dams, and conducting to tanks and channels, sometimes under and sometimes above ground to the cultivated land which it was destined to irrigate; but I propose a more simple, more general, and inexpensive mode for our climate, which is of a vastly more humid character. When it is remembered that water, either in summer or winter, is led across a field naturally dry either by itself or with the assistance of what sewage might be obtained, or the addition of lime or sal ammoniac in small quantities, the effect is quickly seen; and even when nothing but the natural salts which all water, however pure, contains, the cattle, who are the best judges, eat it with great avidity, and when left for mowing the crop is increased by five or six times the amount, and the effect is very lasting as may be noticed by what is called the "Cae odan Ty," or the field under the house on hillside farms. There is scarcely a farm in this country so situated that may not be rendered much more profitable at a very small expense; at any rate one or two meadows might be so made from such a source in addition to their natural meadows already existing. The cheapest way to do this is to make small furrows with the plough, running with a gentle fall across the sloped field or pasture, damming it up with a little wooden or iron

THE WARESLEY STUD FARM.

A special commissioner of the *Sportsman* thus writes :—

Trade, profession, or pursuit opens, in peculiar circle, a distinct subject of and the production of thoroughbred for racing purposes requires deep, great experience, plenty of money, every large share of common sense. As there are few men who realize a profit breeding of racehorses, except those in possession of the means and capable above named. In some countries it is considered derogatory to the of a gentleman to engage in any purchase with a view to making a profit; but in it matters not whether a man be a dustman, a baronet or butcher, his prompts him to make money when he opportunity of doing so. To gentlemen, especially, there is, of course, something flattering in realizing a profit upon than trading in any commercial commodity, and to my thinking there is no occupation so well suited to the mind and of a country squire than breeding for. If a gentleman can realize a profit breeding farm, it proves that he is not good judge of horses, but that he understands their production both in theory and practice, and that he has also the means of giving a liberal system in their purchase, management, mating, and care.

John Watson, proprietor of the Waresley Stud, is in every sense of the word a squire, as his father was before him. He keeps a stud of hunters—the majority of which are thoroughbred—and rides them three days a week during the season. With the old British sport he unites the breeding of both hunters and racehorses, and he has several of the latter whose prowess on

the turf has tended to bring the Waresley stud into repute. He bred The Drummer, who was third for the Derby, and won the Metropolitan Stakes the same season, and it was from Miss Hawthorn, now in his stud, that Captivator, who won the same race last year as a four-year-old with 8 st. 6 lb., was bred. Cecil, winner of the Cesarewitch, is the son of Selina, and this mare, who is also the dam of Lady Salisbury and Catherine, is still in the Waresley pastures, with a remarkably fine yearling filly by Blinkhoolie, and a strong and symmetrical filly foal by the same horse. Waresley is situated about 1 mile from the Hartlebury station on the Great Western Railway, a few miles beyond Kidderminster. The house and part of the stabling are surrounded by what is known as the Bastage farm, consisting of rich pasture land laid out in large fields, some of which are more than 20 acres in extent. This part of the Waresley estate is 300 feet above the level of the sea, and about 18 miles from Malvern. The view from the house commands a fine range of the Shropshire hills, and the Abberley and Woodbury hills in Worcestershire, with the river Severn flowing through the valley about 1½ mile distant. Hartlebury is distant about 12 miles from Worcester, and Waresley is in the same county. It was, I believe, from somewhere in this neighbourhood that Mr Terret, about half a century ago, took his horse Sovereign, a very fine son of Rubens, to Newmarket in his bullock van, and after a lot of jeering from the crack riders of the time, his rural jockey Ben Moses won the Newmarket St Leger on the horse, after a rattling finish with one of the most impudent of the clique. There are thirty-two brood mares and two stallions now in the Waresley stud.

THE DUNMORE SHORTHORNS.

HAVING a few spare hours in Glasgow last week, I took the rail and went up to see the herd of shorthorns that the Earl of Dunmore has gathered together at the Carsie Farm, on the Dunmore Estate, near Stirling. Part of the land is rich alluvial soil, and grows fine feeding grass, but on the western side of the property it appears to be merely reclaimed bog or peat; and a few hundred yards from the black tarred byre may be found heather in abundance. From the acreage and buildings it was apparent that the farm had become overstocked, which is presumably the cause why his lordship is dispersing the larger portion of the herd, which were sold out and out on Thursday, the 5th of September, to the highest bidder. My Northumbrian guide took me first into the black byre, round which are several ryegrass poor meadows, with here and there a small plantation. There are but few bulls for sale, the catalogue giving but six, the others having been sold or steered according to their quality. A red yearling was brought out, and a thick massive fellow he was, the kind of bull I have often seen the canny Aberdonian taking to the far north. He was followed by a roan, a little younger, by Edgar (a bull once taking first premium at the Highland meeting), from Fleda's Farewell, a cow not, it is feared, in a breeding state, but one of the finest in the herd. This bull is also of good size, though not quite so thick as the Aberdonian neighbor.

Many other animals were shown, and we saw some very good specimens of the Aberdeen Angus breed, but they were not for sale. The Highland cattle were kept in a separate enclosure, and were not shown.

The Carsie Farm is situated about five miles from Stirling, and is a large estate belonging to the Earl of Dunmore.

roomy beast, with a grand crest and carriage; the other, Royal Cambridge, a smaller, more compact bull, with a deal of blood-like quality and substance.

In the park were the cows grazing, most of them in good breeding order, and several looked like good dairy animals also. Some, by their deep massive frames, almost parallelograms in form, were particularly striking. Princess, a deep red cow with such a hairy little chub of a bull calf at her side, was one of them, and Lady Elvira another; also Princess Alexandra, a beautiful roan square-looking cow, and Royal Dora, one of the few whites in the herd. Lady Thorndale, another roan, looks much like a good milker, and a sweet-looking cow too, as well as Lady Bright Eyes 1st, of the Wild Eyes strain—a family carefully bred by the late Mr Bates. Two or three fine-looking cows, with broad backs, shewing much symmetry and quality were, I heard, Red Roses and Revelrys, the former an importation from America; likewise an extraordinary high-bred looking roan cow called the Eleventh Lady of Oxford, whose daughter, Oxford Duchess, is included in the sale. The heifers are perhaps the gems of the herd; about a dozen were running among the beech trees knee deep in grass, and a prettier, more even lot are rarely to be seen. One of these, Marchioness of Oxford, strikes the eye at once, by her massive frame and stylish head; possibly she is the best of the lot. Lady Bright Eyes 3d, a pretty roan by Seventh Duke of York, and of the Wild Eyes strain, is another noticeable by her sweetness of character. The foot-and-mouth disease played sad havoc in the winter months, and with its usual after consequences, carried off the calves of two or three of the finest lots. These were having a little additional care; of this lot, Lady Thorndale Bates 2d, and Siddington 7th, two of his

ip's choicest animals, were the most attractive and elegant looking, particularly the r; both shew great style and quality. ale is to be held in the park near the on, where a delicious view of the Forth and the Hills in the distance can be seen. can be no doubt that this is one of the valuable herds that has ever been met with over the Border; the fame of the will bring many to the scene, as their pedigree will the more distinguished pro-

fessional and amateur breeders. The combined excellence of the cattle, the exquisite beauty of the estate and charming scenery around it, afford to your southern subscribers one of the finest sights in Scotland; and it is to be hoped that Lord Dunmore may not only be favoured with a bright day and fair weather, but be encouraged for his zeal and assiduity in all agricultural matters by a capital average for the whole of his stock.—*Shorthorn.*

CATTLE IN THE UNITED STATES.

New York from 11,000 to 12,000 cattle and calves are slaughtered weekly, and the surrounding villages receive from our markets their main supply of dressed meats. We have in this country, as the *New York Times*, a vast range of growing territory to draw from—separated by a great distance in climate and the quality of the food obtainable, in the kinds of food in use and in the breed of stock. In Great Britain the food for cattle is grass, hay, and turnips, but here, in nearly all the States from which the best qualities of meats are obtained, corn is supplied to the cattle instead of hay; and while the meat may not be so good as that which has been turnip-fed, it is only more substantial, fully as tender, and more richly flavoured. Among the errors which tend to reduce the quality and price of the meat in our markets is the prevalent custom of slaughtering cattle when from 2 to 3 years old. Though, of course as tender at the ages of 2 as at any subsequent time, the flesh is not so nutritious, nor is it as finely flavoured as at 4 or 5 years old. Five years is claimed the best age at which cattle should be prepared for food. At that age a well-raised Durham bullock is produced the best meat that goes to our markets. There are large quantities, however, of meat known as half-grades of the

Durham, which, when properly fed and cared for, are also very fine. But the great difficulty, and the one which affects all cattle sent to our markets, lies in the cruel method of their transportation. They have long been and still are crammed into badly-constructed cars, in which they cannot, without causing much loss of time, receive sufficient food or water. They become restive, and before reaching their destination many of them are much bruised, and when dressed large portions of the meat are sometimes found to be totally unfit for use. In very many cases the cattle thus transported by railway lose from 10 to 30 per cent. of their value by the journey. A movement for reform in this matter is now in progress, and it is hoped it may be successful.

Among dressed meats, mutton and lamb are, next to beef, of greatest consequence, excepting, perhaps, pork. The quantity of veal used here is comparatively small. The facts touching the number of sheep sent to this market are somewhat strange, and will, no doubt, surprise those whose favourite meat is mutton. It is declared by the dealers that the supply is not governed by the demand, but depends, to a surprising extent, upon the price of wool. When the price of wool is low, sheep are sent on freely, but when it is high they are retained by the growers, and held over for the production of fleeces. To

so great an extent is the market affected by this cause, that while the weekly average of arrivals in New York (sheep and lambs) during 1870 was nearly 50,000, last year it was only about 26,000, and it is not believed that during the present year the average will very largely exceed 12,000. The decrease, the larger dealers say, is entirely caused by the increase in the market price of wool. Of the number actually received, the finest come from Canada, and the credited reason is that in Canada the favoured breeds are the Leicester and the Cotswold, which are acknowledged to be the best for the table. There are comparatively few sheep of these breeds on this continent, and the main supply is of other varieties. The receipts from Canada come in from early in September, and continue until the following January. In comparison with the mutton of England, it is acknowledged by the larger dealers that, with rare exceptions, the English is the best.

In England the sheep are not allowed to roam as they do in this country, and it is held that our sheep are not sufficiently hardy to thrive under the climatic conditions which obtain in Canada and the northern and western portions of the United States. Concerning the difference in the habit of our people in purchasing as compared with those of England, the dealers say that the mass of the people here call for the more costly pieces, while the inferior portions are left unsold. A very heavy dealer informed the writer that while all over Great Britain every eatable portion of a sheep sold readily, here the breast is often without a market; and the heads, which elsewhere are a regular article of sale, he has not been able to give away, and has been forced to carry them to the refuse grounds at his own expense. The truth is that the people here have a surfeit of beef and mutton, and the result is a very large waste of really nutritious food.

THE COST OF PRODUCING LIVE STOCK.

THOSE who know anything about the matter are well aware that, instead of the high price of butchers' meat being profitable to the producer, it is a grievance of no slight magnitude to him, the fact being that the scarcity of lean stock necessarily causes a competition among farmers, and compels them to pay unusually high rates for animals. The following remarks, which appear in *Land and Water*, have reference to some of the agencies of bringing cattle into the English market:—

The British public have been let us hope, for some years at least, spared the commercial depression which has afflicted the continent. The agricultural community, however, has not been so fortunate. The depression has been felt in all its branches, and the result is a general reduction in

its purchase-value, and that all articles of general consumption are advanced in price. Not to speak of such an important commodity as coal, we are brought face to face with an augmentation in the cost of beef and mutton at which even the pitiless hearts of the Staleybridge butchers have been touched with woe. In point of fact, these blighted beings have to pay such heavy prices for their cattle that they can make little or no profit on the sales, and if they advanced their charges their customers would turn empty-handed away. Unwelcome as it may be to avow it, the influences which affect the price of meat in this country are of such a character that there seems to be little prospect of much being accomplished to increase the producer's profits or diminish the burden of the consumer. Cattle belong to that class of commodity, which, although it can be multiplied to an almost indefinite extent, can

duced only in limited quantities at a cost. If more cattle are wanted they be obtained at a greater outlay. The number of cattle in this country will at all be kept equal to the demand by foreign tation, but as population enlarges the and will steadily grow, and the quantity eat consumed will increase as wages

It follows, therefore, that the wholesale of cattle must be a gradually advancing

What means are there open to us of ng the difficulty? It is unlikely that and can produce more cattle, except n increased cost, otherwise prices l have remained at such a level as en- to stop foreign importation, for in the case the cost of transit and the risks s by disease have to be added to the es incurred by the breeders abroad. nall, indeed, is the variation in price t brings us cattle from other countries, a difference of from 5s. to 10s. per head l keep foreign animals out of the Lon- market altogether. England, however, ite unable to produce sufficient cattle er own consumption, and absolutely more for a supply from Scotland than d for the transit of animals produced e continent. If the cost of transit from, e cost of production in Scotland could duced, or if a larger number of cattle be produced in Scotland at the same then Caledonia might furnish us with supply required to lower the price of

Germany and the Netherlands have any years past supplied us with by far igest portion (about 70 per cent.) of our n cattle; but of these two countries it urs that Holland is a producer of cattle, any like ourselves, an importer—that is y, that statistical research has shown Germany can only send us cattle which as herself first imported, whereas the erlands, though they have prohibited nportation of cattle since January, 1871, able to export more than 100,000 head s country last year, and a considerable er into Germany as well.

w the only method by which we can

increase the supply of these foreign cattle, and at the same time obtain them at a reduced price, is by diminishing the total cost of their production to us—that is, by lessening the price at which the owner can “lay down” his beast in the meat market here. The total expense incurred by the importer who brings his beasts to this country is made up of the cost of production at the place where the animals are fed, the charge for transit to Eng- land, and the profits required in a rather hazardous trade. Labour and rents are the two chief items in the account for breeding. These, of necessity, must gradually increase so long as we get our foreign supplies from the neighbouring countries of Europe; there is, therefore, very little hope of seeing a re- duction under this head. The cost of sea- passage to London is already so small—half the price charged for bringing beasts by rail from Scotland—that we can hardly hope to see a further diminution of the freight. And, lastly, as the risks of the trade arise from forms of cattle disease apparently in- eradicable, we see very little likelihood of being able to introduce foreign cattle into our markets at lower rates than those which already obtain. Denmark, Norway, and Spain may, perhaps, be able to aid us, but it must be recollected that the further we go the heavier are the transit charges, and the greater the risks of losses by disease. It is to Ireland, and to Ireland only, that we must look for the relief required. That country appears capable of breeding beasts in much greater numbers than at present, and at a very moderate cost, and the charges for con- veyance to English ports are by no means considerable. It would seem that England did without Irish cattle at all up to 1759, but a century later, that is in 1869, we were importing beasts from Ireland at the rate of 450,000 a-year. In point of fact, she sends us regularly more cattle than do all other countries put together. This shows that Irish breeders can raise cattle and land them here at less cost than the foreign dealers; and that the trade can be extended is proved by its absolute increase already, as well as by

the growth of the cattle population in Ireland, and by the widening area of land under cultivation for green crops, grass, and clover.

As to the influence which the importation of *dead meat* may have upon our markets we fear that want of space forbids our doing justice to the subject at present. But we may inform our readers that we are now importing about 25,000 tons of freshly slaughtered beef, mutton, and pork in every

year, and we must bear in mind, further, that if the less affluent can once overcome their feeling of dislike towards the preserved meat sent us from Australia, much will have been accomplished to meet the increasing wants of an advancing population, and to prevent the inevitable rise in price due to the growing demand for a commodity which can only be produced here in greater quantity at an augmented cost.

AGRICULTURAL MATTERS IN ITALY.

A CORRESPONDENT of the *Times*, writing from Umbria, in Italy, says that agriculture in that country is in a comparatively primitive state as yet. Within a certain number of years progress has been made in some provinces, as, for instance, in Piedmont and Tuscany; but there is still much to be done. He tells us, however, that efforts are not wanting to enlighten the peasants as to their true interests, and stimulus is given in the shape of prizes offered by agricultural associations, now becoming numerous in Italy. There is one in Perugia, the locality from which the correspondent writes, which gives annual prizes for agricultural improvements and rural constructions.

The relations between the land-holding and the land-cultivating classes in Umbria, he adds, are much the same as in Tuscany. A landed proprietor divides his property into lots, and generally, each lot is supposed to be sufficient for a family to cultivate. The peasant has his tools; everything else is supplied by the proprietor. The peasant is not a tenant, but a hired labourer. He is not bound to the land, and he is not a serf. He is a free man, and he is a hired labourer. He is not a tenant, but a hired labourer. He is not bound to the land, and he is not a serf. He is a free man, and he is a hired labourer.

far as possible in ways little costly to himself. The peasant has generally very little capital, and the loss of beasts employed upon the land often falls heavily upon him, for he has to bear half the cost of those which replace them. Usually these losses are more than he has means at once to meet, and the sum due has to be deducted from his share of the revenue of the *podere*, or farm. Thus he may become indebted beyond the possibility of redemption, and Umbrian proprietors have told me that their losses in this way are sometimes heavy, as the peasant often becomes bankrupt and leaves his land, or is ejected from it. The contracts are annual, with six months' notice. The system just described has the obvious tendency to keep the class of day labourers within narrow limits. That class exists, however, and the usual day's wage is 1*f*, except in harvest time, when it is 1½*f*, with food in addition. I am assured that a labourer can live on 1*f* a day in this province; if he is married his wife earns something, and his children, as they grow up, contribute.

Every peasant occupant receives, with his share of land, a house for himself and family. These dwellings are generally much upon the same plan, one-storied buildings with the stables below, and, and, above, a kitchen in the centre, with bed-rooms around it, and a store-room or granary. The *casengoli*, or hired

urers, usually inhabit the villages, although sometimes they are allowed to occupy houses on the estates at a very low rent.

Plans have their drawbacks. In the past, men of that class, grouped together, very often got led into vicious courses, and some became robbers. If they dwell upon estates, they are apt to help themselves to the produce of the fields, and so also do some of the inhabitants of the villages. Corn and olives are pretty safe; they cannot be easily carried away in sufficient quantities to make it worth the risk and toil; but when maize and the grapes are ripening, the tenant-farmer has to keep watch at night, and the members of the family take it in turns to patrol the *podere* and deter marauders. Nevertheless, the moral state of the Umbrian population is described to me as not so bad although it is admitted there has been a decline in this respect since the check of priestly supervision and instruction has been removed, and not yet replaced by a better system of education. But one hears of brigandage or *ricatti* (kidnapping for ransom), the roads are safe, and one may travel anywhere without fear of molestation. I have been repeatedly struck, since my arrival in the Province, by the frank, hand-countenances and ready courtesy of the peasantry and by the beauty of the children. Upon the whole, the rural population of Umbria seem to be more moral and docile, but less civilized than that of any.

Italy has been so tried by wars, revolutions and misgovernment, that it is not surprising if improvements long since commonly introduced in England and other countries are now penetrating here. Agricultural machinery begins to make its way, and it will do so more rapidly but for want of capital. The landholders are generally not so well off and are exhausted by the heavy taxes which presses particularly hard upon them.

A new class of landholders, however, is springing up; men who have made money in cities, in banks and other speculations, have bought lands and can afford to

introduce novelties. These are the men who must be looked to for costly improvements, and for those changes in cultivation which, for a time, preclude crops, such, for instance, as the formation of new vineyards and a better manufacture of wine. Cattle-breeding should also be encouraged in Umbria. It is already carried on to a considerable extent, and there are some noted cattle fairs within 20 miles of Perugia, at Umbertide (formerly known as Frata), and at Tavernelli, which is more especially the pig fair. Pigs seem plentiful hereabouts; one meets them frequently in groups at the roadside, long-legged, flat-sided, grass-munching grunters, escorted by boys. An English farmer would look at them contemptuously, but few of the domestic animals get much food in this country beyond what they can pick up for themselves.

In conclusion, I throw together a few facts. Since 1860 there has been a certain improvement in the cultivation of the land in Umbria, but it has not gone very far. There has been a decided increase in the requirements of the upper classes in the way of comfort, in their dwellings, furniture, &c., a craving after better things—in other words, a progress in civilization. The rural population have most extraordinary prejudices. As a general rule, their deeply-rooted prejudices stand much in the way of their improvement. Thus, they look suspiciously on machinery, obvious though its advantages may be; and an Umbrian gentleman told me of the difficulty there is in preventing the almost total extermination, by nets and snares, of small birds, and of the *tordi* or *grives*, a kind of thrush much used by cooks. The peasants take the ignorant view that the birds devour their crops, and will not be persuaded of their value as consumers of many injurious insects. This idea, and the temptation of profit, makes them break the law which forbids their destruction otherwise than by powder and shot, and at certain seasons of the year. When winter sets in there are *razzias* among the small birds, and especially of the juniper-eating, well-flavoured *tordo*, and this explains

the abundance in which that petty game is supplied to wondering foreigners at Italian *tables d'hôte*.

Finally, I learn that the land of Umbria cannot be fairly estimated to yield its owners, on an average of years, more than 4 per cent. This may appear little in a country favoured with so much rich soil and so fine a climate, and yet it will seem high if we consider the

imperfect methods employed to extract the wealth from the land. There seems no reason why, within a few years, by the judicious adoption of modern improvements, and by stimulating the people to greater industry, the proprietor's revenue should not be largely increased, while the comfort and well-being of the farmer shall be proportionately augmented.

COMPENSATING A RETIRING TENANT.

By Mr J. H. HOLLEY.*

IN considering the question of compensation to a tenant on leaving a farm, he proposed first to call attention to the relative positions of owner and occupier. Their position was clearly a joint speculation; for one found the capital to purchase the farm, and the other found the skill and the capital that was necessary for the cultivation of that farm. The purchaser embarked about five times as much capital as the occupier. Supposing a man accumulated the sum of £20,000, and purchased a farm of 400 acres, he must be content with three per cent. interest, the amount generally obtained from investments in land, and the occupier ought to have £4000 to enable him to cultivate the farm to the best advantage, and he ought also to realise at least 10 per cent.—five per cent. on his capital and five per cent. for his skill and interest—and if a twenty years' lease had been granted, at the end of that term the farm ought to be improved and in a position to be let for a higher rent than when he first took it. The occupier, therefore, in the course of his lease, has expended his capital and his skill, and has improved the land, and at the end of the lease he is to be compensated for the value of his capital and his skill, and for the value of the improvement he has made. This is the principle of compensation, and it is the principle which should govern the landlord and the tenant in every case.

suppose another case, viz., that the occupier borrowed the money and purchased the farm himself. What would be his position in such a case as that? If he obtained the money at four per cent. he would pay £200 a year more for interest than he had to pay as rent, which at the end of twenty years would amount to £4000, a larger sum than any compensation would ever be computed at. These facts proved how the interest of the tenant was dovetailed with that of the owner.

THE BENEFITS OF LONG LEASES.

The best security and protection that he could suggest for the tenant was afforded by long leases, renewable some years before the term expired. As a proof of the efficiency of long leases, he would give them just two illustrations, the first of which had reference to an estate of some £10,000 a-year in Ireland, belonging to the Earl of Portsmouth. His lordship's predecessors and himself had been in the habit of granting leases for thirty years, giving also to the tenant the option of selling the goodwill of the remainder of the unexpired term, provided he brought forward a respectable and respectable man, and the result was that this estate was in the most flourishing condition, the tenants contented, and what was far more important still, life and property were secure—a state of things which was unusual in Ireland. The other illustration applied to Holkham Estate in

* See the *Country Gentleman's Magazine*, January 1854, p. 10.

olk. The late Lord Leicester granted a lease for twenty-one years, and there was no lease of such large extent (some 60,000 acres) of better order than that was. If yearly rents must be continued, the best substitute for the lease that he could suggest was of yearly agreements, with a stipulation that two or three years' notice should be given previous to quitting the farm. It was not to be supposed that any compensation was to be submitted to could recoup the tenant who was suddenly turned out of his land at six months' notice. As it could not be provided for in any general lease, or any form of custom, the large outlay made by a tenant in permanent improvement should be made under special agreement.

TEAM PLOUGHING—LOCAL TAXATION.

There were other resources for the relief of agricultural interests which required the attention and consideration of Chambers of Agriculture, there being for example, the development of machinery and the reduction of burthens on land. That powerful engine, the steam plough and grubber, would, he believed, eventually economise in tillage more than the increased amount of wages was to be established. Two years ago he passed on a farm of thirteen hundred acres all the stubbles grubbed at seven shillings per acre by steam power, and the work was more efficiently performed than could have been done by any amount of horse power. All expenditure contingent on the cultivation of a farm must be recouped out of the produce, and consequently every additional burthen must add to the cost of production, and fall on the great necessities of life, viz., bread, meat, butter, and milk. He mattered not whether it was manual labour, tradesmen's bills, tithes, rates, or taxes, all must be paid before a shilling went out of the pocket of the occupier, to hand over to the owner as rent, which rent was simply a portion of the surplus profit. If a shilling per acre was to be collected as a national contribution rate, and another shilling for every organization, the cash must be extracted from the total returns of the farm,

and would fall chiefly upon the tenant. The Birmingham politician might as well argue that the cost of machinery and all other expenditure necessary for raising the productions of the farm came out of the pocket of the landlord as to say that the additional local taxation burthens would. As the greater portion of the land in England was inferior soil, it was clear that a very small increase of burthens would not only swallow the whole rent, but would also throw that low class of land out of cultivation. The loss that the owners of personal wealth would then sustain would be more than the payment of an equitable share of local taxation, the amount of which was already 20 per cent. on real property, and if spread over every other class of wealth would be about 3 per cent. Under any other circumstances he warned them against legislative interference between the owner and occupier. The mention of such interference reminded him of the Prime Minister who summoned a deputation of merchants before him, and when they appeared he asked them what he could do for them to benefit their interests. Their reply was, "Let us alone; we can manage our own business better than you can for us." Similarly with other trades and professions, the progress and prosperity of agriculturists depended upon their own energy and intelligence, and if those who devoted the whole of their time to agricultural development could not discern what was really to their own advantage, then their case was hopeless. He remembered many years since, when Lord Althorp was Chancellor of the Exchequer, the Government earnestly attempted to promote the interest of the agriculturalists, and after much inquiry they found the only assistance they could give was to take the tax off the shepherds' dogs. He mentioned these facts to show how unlikely they were to derive help from any extraneous sources.

THE NATURE OF A FARMING AGREEMENT : THE NORFOLK CUSTOM.

On entering into an engagement for a farm the transaction was a voluntary arrangement between two private individuals. In the

treaty the man who was about to take the farm could make any stipulation he pleased. He could refuse it if a long lease was not granted, and he could demand the right to kill the vermin called rabbits, which right the law now gave the tenant if he did not sign away his right to all the game. There was just one other matter that he desired to mention relative to quitting a farm. In Norfolk the custom was to enter into possession early in October, the incoming tenant paying for the roots and hay, and also for the thrashing

of the corn, retaining the straw and chaff. Consequently, the out-going tenant grew as large a crop of hay and roots in the last year as in any previous year of his term, and the new tenant had thus the material to feed beasts and sheep, and make the requisite farm-yard manure for growing good crops during the first summer, the farm being got into continuous and good cultivation; whereas taking possession on Lady-day and clearing the land did not only make the farm unproductive for the first year, but injured it for years.

THE PURIFICATION AND UTILIZATION OF SEWAGE.

THE Committee of the British Association to inquire into the treatment and utilization of sewage, made its fourth annual report to the Association at the Brighton meeting.

The Committee, since its re-appointment at the last meeting of the Association at Edinburgh, has pursued the inquiry intrusted to it; and, as heretofore, its investigations have been limited to such matters as have afforded promise of practical utility. Among the various methods of treatment of sewage brought under its notice, the process of Messrs Weare, at the Stoke Union Workhouse, the precipitation of the sludge and its conversion into cement at Ealing, and the system of intermittent downward filtration at Merthyr Tydfil have appeared most important, and have accordingly been inquired into. A process known as Whitthred's patent has also been inquired into; and, the Committee having reported last year upon the farms at Tunbridge Wells and Earlswood, it was thought advisable to inspect them again. The observations at Breton's farm have been carried on uninterruptedly, and have now extended over a period of more than two years. The experience thus gained from the continuous records of the flow and sampling, and analysis of the effluent water, the application of the sewage to various crops, has resulted in the following conclusions:

1. The purification effected by the process of Messrs Weare, proved valuable to local authorities, and of great interest to the farming community. 2. The process of precipitation and conversion into cement at Ealing, was found to be of great value to the local authorities, and of great interest to the farming community. 3. The system of intermittent downward filtration at Merthyr Tydfil, was found to be of great value to the local authorities, and of great interest to the farming community. 4. The observations at Breton's farm, have shown that the sewage can be used for agricultural purposes, and that the process of intermittent downward filtration is the most effective method of purification.

as possible; but it is felt that, in order to perfect them, especially as regards the important branch relating to the effect of sewage upon the crops grown, it will be necessary to continue them for at least some months longer. This cannot be done unless further funds are placed at the disposal of the Committee. The large number of analyses already made, together with the great expense of an assistant constantly at Breton's Farm, and the various other investigations undertaken, have now nearly exhausted the special fund contributed by the towns. In requesting to be re-appointed, the Committee begs to submit to the Council of the British Association the desirableness of placing it in a position to complete the long and anxious inquiry with which it has been intrusted.

After this general preamble the Report falls into five Sections, the first of which deals with Weare's process, as found in operation at the workhouse of Stoke-upon-Trent,—an establishment containing about 750 inmates. The process consists, in the first instance, of simple filtration through coarse ashes and charcoal in a large tank divided into two compartments, so that one may be at work while the other is being cleared. These compartments are each divided into a large and a small chamber. The raw sewage is brought to a small receiver, and from it turned by means of sluices into the first compartment. The samples of sewage taken by the Committee's inspector were obtained from this receiver, through which about 5000 gallons passed in twenty-four hours. From the large chamber of the tank the sewage

is passed through wooden screens, containing 2 feet of charcoal, into the small chamber, which contains about 5 feet 6 inches of rough charcoal, through which the sewage percolates into a smaller tank, thus completing the first stage of filtration. The suspended matters are partly arrested by the wooden and charcoal screens; and there is a further deposit in the small chamber, which is usually cleared once in six months. From the second tank the sewage, after again passing through a screen containing 6 inches of rough charcoal, is conveyed by a 12-inch pipe to the "deodorizers," which are three in number. The first and largest has a surface area of nearly 200 square feet, and contains a depth of 5 feet 6 inches of rough charcoal; the second has an area of about 70 square feet, and contains 2 feet 6 inches of charcoal of smaller size; the last is a small box containing 4 feet of fine charcoal, supplemented by layers of flannel and filter cloth. This completes the process, the effluent water being discharged into a small well, from which samples were taken for analysis. Wood charcoal was used at the time of the inspection, but it was stated that it was proposed to use peat charcoal. The practice is to remove the "spent" charcoal from the last deodorizer to the second, from the second to the first, and from the first to the first tank.

The flow of effluent water for the period of twenty-four hours amounted to only about 2000 gallons, as against 5000 gallons of sewage received into the first tank during the same period. The deposit removed from the tanks, with the refuse of the establishment, is utilized upon a farm belonging to the union, and cultivated entirely by the inmates. Complete analysis of the sewage and effluent water are appended, and the Committee observe that the general result is to remove the suspended matter and much to reduce the quantity of ammonia and organic nitrogen. No oxidation occurs, and the effluent water is to all intents and purposes merely diluted sewage.

The second section of the Report dealt with processes in use at Ealing, namely, upward filtration and the method of General Scott. The Committee declare that upward filtration is absolutely worthless, and with regard to General Scott's process they say that by it the suspended matters are precipitated very completely, but that the effluent water was shown by analysis to contain rather more than two-thirds of the chlorine and of the dissolved nitrogen of the sewage. They remark, however, that the dis-

solved nitrogen appears in a different way in the effluent water and in the sewage, the actual ammonia is reduced to one-quarter of its original amount, and the organic nitrogen, doubtless from a solution of some of the suspended nitrogenous matters, is nearly doubled. Some oxidation has also occurred, by which nitrates appear in the solution. Such water would be at once too valuable to be wasted, and too impure to be discharged into a river. It is not pretended that the process is capable of purifying the sewage; its object being merely the separation and deodorization of the sludge (which in the majority of cases must be removed in some way before the sewage can be applied to agricultural purposes), and its ultimate employment as fuel for the manufacture of cement. On the whole, the process, when perfected, promises well as a means of treating one of the difficulties of the sewage question.

The third section contains an account of visits to the Earlswood and Tunbridge Wells Farms. The Earlswood Farm was found to be in much the same state as when reported on last year—that is to say, that the sewage flows over it, instead of percolating through it, from saturation of the soil for want of deep drainage. At Tunbridge Wells the sewage was very offensive, but the effluent water was running away tolerably pure. Here, also, however, an evidence of the value of subsoil drainage in connexion with sewage irrigation was afforded by the marked contrast between the state of a bean crop in the drained and the undrained portion of the same field.

The fourth section describes the results of an arrangement first suggested and tried as a laboratory experiment by the Rivers Pollution Commission, and first carried into actual practice by the authorities of Merthyr Tydfil at the neighbouring village of Troedryhiw. The method is known as that of "intermittent downward filtration;" and consists essentially in the substitution of depth of soil for area as a purifying agent, with especial reference to conditions under which extent of area cannot be obtained. The Rivers Commissioners stated that an acre of filtering material 6 feet deep would cleanse the sewage of 3300 people; but they expressed an opinion that, while successful from a remedial point of view, the system would be very wasteful as not utilizing the valuable manurial properties of sewage, and for this reason it was only to be recommended on a small scale, or where circumstances rendered other processes difficult and expensive. In 1868

and 1869 injunctions were granted by the Court of Chancery to prevent the Local Board of Merthyr Tydfil from discharging the sewage of that town into the river Taff, and in 1870 the Board purchased 70 or 80 acres of land below the village of Troedyrhiw, of which about 20 acres have been converted into a filter on the plan suggested by the Commissioners. The soil consists of a deep bed of gravel (probably the former river bed of the Taff, which is embanked on the east side and raised above the valley) composed of rounded pebble of the old red sandstone and coal measure formations interspersed with some loam and beds of sand, forming an extremely porous subsoil with a vegetable mould upon the surface. The land has been pipe-drained at a depth of 7 feet, and the pipes are concentrated at the lowest corner, where the effluent water is discharged into an open drain which leads to the river Taff, at some distance down the valley. The area is laid out in square beds, intersected by roads and paths, along which are constructed the main carriers which receive the sewage from the outfall sewer and distribute it over the beds. The sewage before entering the farm is screened through a bed of slag which arrests the coarser matters. The system which is adopted in applying the sewage is called the intermittent—that is, the land being divided into four portions, the sewage is turned on to each in succession of six hours at a time, leaving an interval of eighteen hours for rest and aeration of the soil. The surface of land was cultivated to a depth of from 16 to 18 inches, and was laid up in ridges in order that the sewage might run down the furrows, while the ridges were planted with cabbages and other vegetables. The sewage was originally received from Merthyr Tydfil in a very diluted condition; and this dilution was increased by percolation of water from the river, so that the quantity of effluent water was nearly double that of the sewage supplied. The average quantity of the latter is about 100,000 gallons per acre.

The Committee paid both a summer and a winter visit to the farm, and completed a variety of analyses. They declare the general result of the process to be that suspended matters are removed, and that the ammonia and nitrogenous organic matters held in solution are almost completely oxidized, so that they escape in the effluent water as nitrates and nitrites. The sewage is therefore satisfactorily purified, but the process cannot be looked upon as one of utilization.

In Section 5 were given the results of the continued observation of the application of sewage to Breton's Farm, at Romford; and during the last year the Committee have added to the data formerly ascertained particulars of the crops grown on the farm during the twelve months from March 25, 1871, to March 24, 1872. To make this inquiry more complete, and of greater practical utility, the Committee made an alteration in the form of the analysis of the sewage and affluent water, so as to determine the total nitrogen. The facts were expressed in six tables, which it would be impossible here to reproduce; but the result to be deduced from the grand totals is that of every 100 parts of nitrogen distributed over the farm during the year, 10.09 parts were found in the effluent water, 39.50 parts were recovered in the crops, and 50.41 parts (or in round numbers one half) were unaccounted for. Of this half the greater part must have remained in the soil; and as the average composition of the soil previously to the application of the sewage was determined by the Committee, it is their intention to determine also the proportion of this missing nitrogen which does actually remain in the soil at various depths. The two main facts at present ascertained at Breton's Farm are, that only 10 per cent. of the total nitrogen applied to the land escaped in the effluent water (of which 10 per cent., only a fractional quantity, is in an organic form), and that 40 per cent. was recovered in the crops grown.

The Garden.

SOME FLOWERING BEGONIAS.

HOW few amateurs, or in fact, gardeners either, know or care for these beautiful plants, which are so peculiarly suited to make our plant houses gay and decorate our dwelling apartments during the dullest portion of the year. I can only account for the general apathy exhibited towards this genus, in the fact of the word *Begonia* being old and familiar, whilst latterly anything possessing the (oftentimes) delusive charm of novelty have been first favourites. In spite of this, however, the Messrs. Veitch & Sons, of Chelsea, have been persistent lovers of this family of plants, and during the past few years have introduced many new and beautiful species, and have also been busily hybridising at home. The result of these labours they now offer to their fellow horticulturists, and the attractions of these fresh forms are steadily, I believe, curing many patients from the disease which I call *Begonia-blindness*, and which has been so prevalent for some years. Of this I am certain, that all those who discard these plants from their collections are depriving themselves of some of the brightest and best winter-blooming plants in the whole vegetable kingdom.

Begonias are not only extremely beautiful, but are amongst the easiest to grow of any plants with which I am acquainted; they require no extra amount of skill in their management, and thus may fairly be said to be within the reach of all and every one possessing the accommodation of a cool stove. Indeed I well remember the first *Begonia* I ever saw. It was a plant of the fine old *B. discolor*, which my grandmother, who was a keen gardener in her day, used to grow in

her best parlour window. Think of this, despairing amateurs!

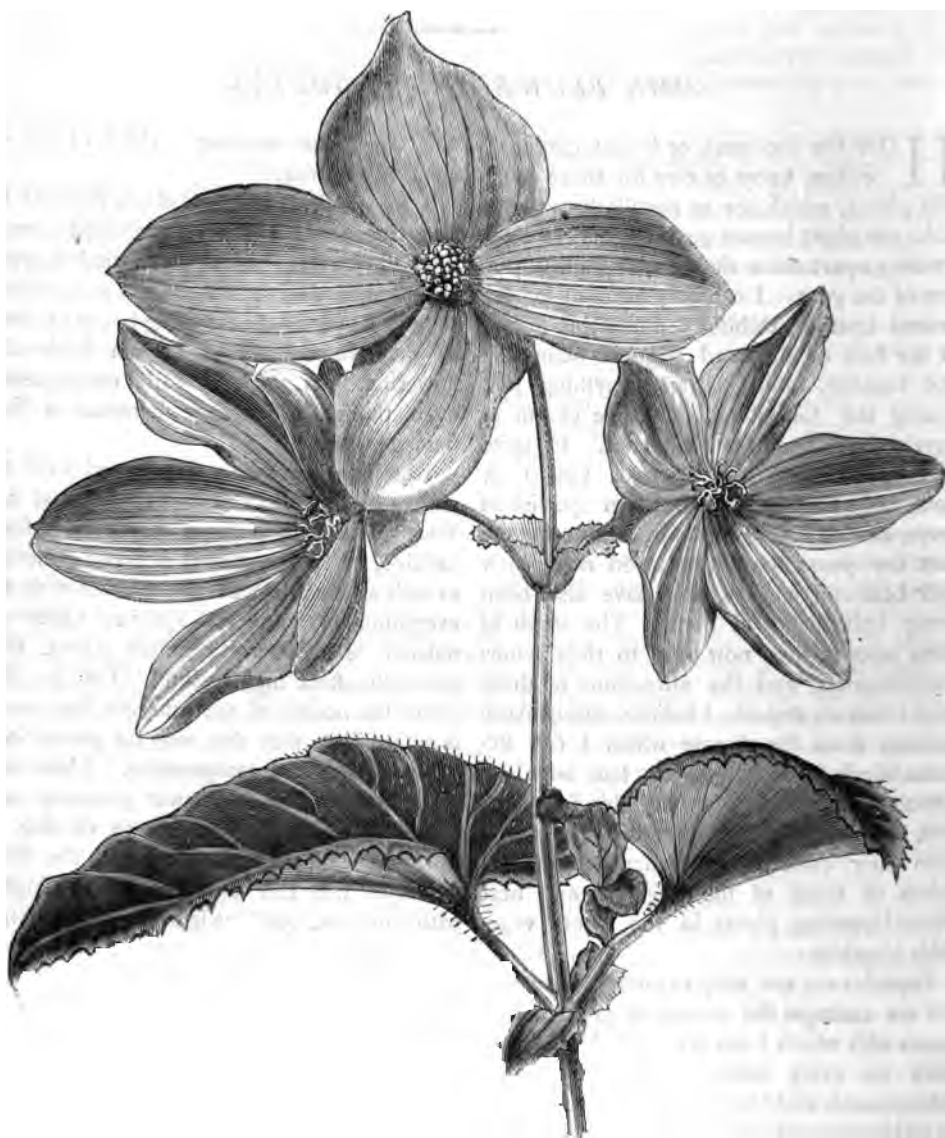
I must admit I do not think many of the flowering kinds could be managed successfully all the year round in a window, yet I am quite sure most of them will stand a long time in flower in the dwelling-house; indeed, as they should always be cut back after flowering, it is really of little consequence, even though the foliage becomes a little damaged.

Begonias are widely distributed over the globe, being found in both the East and West Indies, in various parts of Africa, Mexico, on the Continent of South America, as well as the adjacent islands, but with the exception of some few species, which are natives of Western Tropical Africa, they generally affect high regions. This is a fact worth the notice of the amateur, because it is a sure sign that they may be grown in a comparatively low temperature. I have had them to grow well and flower profusely in a temperature ranging from 50 to 60 deg. of fire heat. Of course in summer the thermometer will run up considerably higher with sun heat, but that is of no consequence providing a moist atmosphere is maintained with a due proportion of air; at the same time the plants must be sheltered from the direct rays of the sun. In potting be sure that the drainage is good and effective, and for soil use a mixture of peat, loam, and thoroughly decomposed manure in about equal parts, adding a portion of silver or sharp river sand. They enjoy a liberal supply of water to their roots, and a moist atmosphere when growing, but I have invariably found that they do better if not syringed over head, therefore

the floors and stages should be moistened with the watering can, instead of giving it them over head. The style of growing Begonias will entirely depend upon the requirements of the amateur. For instance, if the

The following brief descriptions comprise some of the very best kinds, and all will be found well deserving the attention of both amateurs and gardeners.

B. intermedia.—My list commences with



the flowers and stages should be moistened with the watering can, instead of giving it them over head. The style of growing Begonias will entirely depend upon the requirements of the amateur. For instance, if the

the newest kinds, not because it is the newest, but because it is one of the best. It is a garden hybrid, raised by the Messrs. Veitch, between *B. Veitchii* and *B. Boliviana*, and to these gentlemen we are indebted

he accompanying illustrations. The plant but greenhouse species, introduced from question is of erect and free branching Natal, some six or seven years since. t, and attains a height when well grown It seldom grows much above a foot in about 18 inches; the "leaves have much height; the leaves are mostly radical, about form and substance of *B. Veitchii*, but 4 inches across and orbicular; in shape the



Fig. 2.—*Begonia Chelsonii*.—See page 304.

oothed like *B. Boliviensis*." The flowers large, and of a deep vermillion red. "It seeds in a greenhouse." See fig. 1.

. *geranioides*.—This is a very elegant,

upper side is deep green, beneath they are paler; the flowers are large and pure white, the beauty of these being considerably enhanced by the bright golden yellow of the

stamens. It is an early spring bloomer, and very ornamental.

B. odorata.—This is an evergreen species, deserving general cultivation for the delicate

B. Verschaffeltii.—A garden hybrid, which has unfortunately become very rare. It has unequally lobed deep green leaves, and is of a free spreading habit; the flowers are pro-



flowers are large and branching panicles, both male and female blooms being charming bright rose pink in colour.

B. Digswelliana.—Another garden hybrid of great beauty, well adapted for the decoration of apartments during winter; erect in

habit, with small dark green leaves. It produces an abundance of its branching panicles of flowers, which are light pink when open, whilst the buds are deep crimson.

C. Meyerii.—A Brazilian species, which

tion ; extremely handsome, but still somewhat rare ; the leaves are broad, light green, and somewhat uneven on the upper surface, the spike is erect, bearing large deep rosy red flowers of great substance. It comes to us

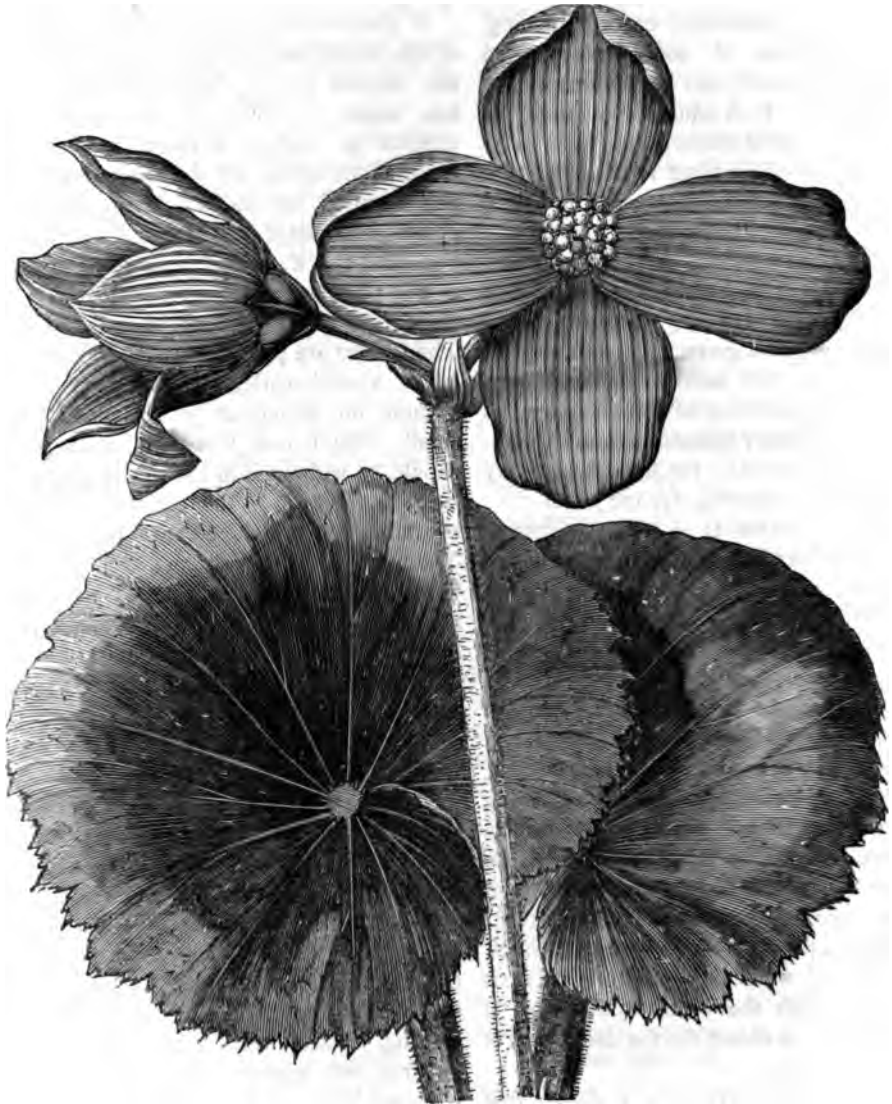


Fig. 4.—*Begonia Veitchii*.—See page 305.

blooms all winter and spring, and succeeds admirably in the drawing-room. The leaves are clothed with soft light brown hairs, whilst its large and handsome flowers are pure white.

B. rosaflorea.—A plant of recent introduc-

from the mountains of Peru, and is tuberous rooted. These tuberous kinds all require a period of rest ; after blooming they lose their leaves and remain dormant for a short time. Care must, however, be taken that they are

not kept quite dry, or the probability is that death will ensue, and just when the amateur expects to see them start into fresh growth.

B. Sapeyronzii.—An old favourite of mine, and certainly one of the most beautiful winter blooming kinds. It is an erect growing species, producing erect, branching, compact panicles of soft flesh-coloured flowers, and it continues in perfection for several months. It is admirably adapted for indoor decoration in winter.

B. Chelsonii.—This plant is another of the splendid hybrids for which we are indebted to the Messrs Veitch & Sons, being the result of a cross between *B. Boliviensis* and *B. Sedenii* (itself a hybrid). It is of free growth, the leaves being oblique ovate-lanceolate, and dark green in colour, flowers large, drooping, rich orange suffused with deep red. Independent of its rich colour, its value is considerably enhanced from its continuing to bloom all through the dreary winter months. (See fig. 2, page 301.)

B. Pearcei.—This is a tuberous-rooted species, introduced and named after my unfortunate friend Pearce, who was one of the most indefatigable collectors who ever left these shores. The habit is dwarf; leaves on the upper side dark velvety green with lighter veins, whilst below they are pinkish red, mottled with light green; flowers large, bright yellow. It is a most desirable plant.

B. phyllomanica.—A stout, erect-growing plant, with large unequally cordate ovate subpellate dark-green leaves, fringed at the margins with stiff hairs; the stem and branches are clothed with little leaves; flowers large, produced in drooping racemes,

richly suffused with pink. Blooming as it is from the middle of the winter and spring months, it is admirably adapted for indoor decoration.

B. Boliviensis.—This is a very free-growing plant, with large, deeply lobed, dark green leaves, and large, drooping racemes of flowers, pure white, suffused with rosy-pink. It blooms from January to May, and is admirably adapted for the decoration of apartments.

ing plant; the leaves are large, deeply lacinated, dark green blotched with black; the racemes are much branched and profusely laden with large pink flowers, which are produced all through the winter and spring.

B. fuchsoides.—Amongst all the members of this family that I know, none can surpass this species for its chaste beauty. Grown into small specimens, it is impossible to imagine or produce anything more elegant for the adornment of the dinner-table. If not required for indoor decoration, when grown into large specimens it is equally beautiful, and if trained up a pillar or rafter in the plant stove, it is really lovely. The leaves are small, oblique, and dark green. The flowers are produced in abundance, and are of a vivid scarlet, and drooping. In my opinion no collection of plants, however small, should lack this gem, and no lady should be without it in the drawing-room.

B. manicata.—In this plant we have ornamental foliage combined with large flowers. The leaves are large, oblique, and light green, the footstalks being ornamented with bright red frill-like fringes. The flower spike is erect and much branched, whilst its numerous flowers are of a delicate soft pink. It blooms from January to May.

B. dipetala.—A superb plant, flowering the whole of the winter and spring. It is erect in habit, with oblique cordate acuminate leaves, which are serrate at the edges and dark green. The panicles are drooping, bearing a profusion of soft rose-coloured blooms.

B. Sedenii.—Another of the Chelsea hybrids, having *B. Boliviensis* for one parent, and, like it, having tuberous roots. It is remarkably free both in flower and growth, bearing, even on small plants, a profusion of its large rich magenta-coloured flowers, and succeeds in quite greenhouse temperature.

B. Boliviensis.—An evergreen kind, with large, deeply lobed, dark green leaves. The flowers are large, and produced in great abundance; pure white, delicately suffused with rosy-pink. It blooms from January to May, and is admirably adapted for the decoration of apartments.

versifolia.—Alas, that I should have that I have not seen this plant in an garden for a long time! A year or so, when travelling in Germany, I saw it in a private garden, but in very poor condition. It is one of the very best for decoration, producing in abundance cherry-coloured flowers, and it continues in bloom on an immense time.

erophylla.—This is a robust growing, leafless plant of great beauty; the leaves are ovate, acute and deeply lobed, and fleshy, and of a peculiar glaucous tinge. The racemes are dense and bearing all the winter long a profusion of large snow-white flowers.

Boliviensis.—A fine tuberous-rooted plant, which has been parent to so many other hybrids since its introduction. It is some two feet high. Leaves bright green whilst the flowers are of a rich, bright red. It is more a summer than a winter bloomer. (See fig. 3, page 302.)

colorata.—This fine old plant, which is sometimes called *B. Evansiana*, I wish to recommend for a window plant, its constitution being it admirably adapted for that purpose. It is a robust grower, with an erect habit and broad leaves, dark green above, and with dull purple below, and bearing racemes of large pure white, delicately fringed flowers.

Dreyeri.—Another tuberous-rooted plant, which is scarcely ever out of flower. A dwarf plant, with small dark green leaves and large pure white blooms—a gem for a wing-room decoration.

hydrocotylifolia.—In spite of its long name this is really a charming old plant, one which I have frequently seen grown as a window decorator by careful and enthusiastic growers. It is a dwarf spreading species, with nearly round leaves, which are dark green veined with blackish green; the scapes are erect, bearing its large bright pink flowers on branching panicles, and these it is able to throw up in succession all the

year. *B. nitida*.—This is another winter-blooming kind, which displays its chaste blooms to great advantage in the boudoir. The leaves are small, bright dark green, from between which the large trusses of snow-white flowers are contrasted beautifully.

B. Kunthiana.—A fine species, which may be grown for dinner-table decoration with advantage, but in any state it is a charming object in the dwelling-house. It is erect in growth; the leaves are oblique, oblong, lanceolate, and dark polished green above, whilst below they are reddish crimson; flowers large and pure white; the whole forming a charming combination of colour.

B. Weltoniensis.—An admirable plant of dwarf compact habit; the foliage is small and dark green, whilst the flowers are large, and bright rich pink in colour. It is a garden hybrid, and continues to bloom from January to May.

B. Veitchii.—Here we have a grand stemless species, introduced by my late friend Pearce from Cuzco in Peru, where it was found growing at some 12,000 feet above the sea-level. The leaves are ovate-cordate, some five inches across, thick and fleshy in texture, and deep green in colour, except the margins, which are red. The flower scape is erect, bearing large vermilion red flowers, measuring two inches or more in diameter, which, in addition to their showy colour, are deliciously fragrant. It is a tuberous-rooted plant, said to be hardy. This assertion, however, I cannot at present endorse. My first attempt at its cultivation has been a failure; but I do not condemn it yet on that account, but have now another plant in my trial ground which I hope will survive the ensuing winter. (See fig. 4, page 303.)

I shall now leave this subject, hoping these rough notes will lead some of my readers to take up the culture of these truly charming plants. Much more might be said, and many more beautiful species submitted, did space permit, and I may perhaps (if time allows of it) return to the subject at a future date.—*Vive Vale*.

HERBACEOUS PLANTS.

AJUGA REPTANS (Common Bugle).—A most useful and interesting plant, by no means rare in moist meadows and open woods in this country. There are two varieties of this species, one with white, the other with pale purple flowers; there is also a variegated form. All are useful plants for the flower garden, as edging plants or otherwise; spikes about 6 inches high, flowers in whorls—April and May.

Ajuga pyramidalis (Geneva Bugle).—This is a biennial species, native of Southern Europe, in some respects differing little from the preceding. The spike diminishing upwards gives it a pyramid form; spike of flowers longer and more hardy. It does not produce runners, and succeeds well in the open border in a moist shady situation, grows about a foot high, and blooms in May. Both species are easily propagated by cuttings of the side shoots, at any moist mild season of the year.

Alchemilla vulgaris (Bearsfoot or Ladies' Mantle).—A well-known native plant, common on sloping banks and high pastures; yellowish green, perhaps more interesting than beautiful, being destitute of any corollas. But, taken as a whole, it is worthy of a place in the most select collection; the leaves, which are sustained in long petioles, are divided into several lobes, roundish and scalloped at the edges (hence the name, Ladies' Mantle.) The flower-stems are often a foot or more high, divided into many branches and bear each

When once thoroughly established, they propagate themselves fast enough by seed.

Allium.—Very few of the many species of Garlic are worthy of cultivation as hardy ornamental plants. The following is a selection:—*A. molle* is worthy of a place in the mixed border, for the sake of its bright yellow flowers, which are showy; the three outer petals are spreading, the three inner ones erect; lasts several weeks in perfection. It should be planted at some distance from the walk, its strong Garlic scent being objectionable; grows about 18 inches high, and flowers in May. *A. roseum*, as an early blooming species, and *A. odoratum*, as a late bloomer, with white flowers, are probably the best and cheapest kinds. They are natives of the Pyrenees, and succeed well in any garden soil. They increase rapidly by division, which should be done in autumn.

Alstræmaria.—A genus of singularly interesting and beautiful plants, tuberous-rooted perennials, natives of Mexico and South America, but quite hardy in good light, well-drained soils; in most parts of Britain, in damp, tenacious soils, they are liable to die out, in which case they should be grown in pots in a cold frame, and plunged in the open border in April. They bloom during July and August. *A. Pelegrina* is a charming species, with whitish flowers, beautifully veined and spotted with red. *A. aurea*, and *A. psittacina*, with purple flowers, are the hardiest and best.

Althæa officinalis (Common Marsh Mallow), *A. narbonensis* (Narbon Mallow), and *A. rosea* (Rose Mallow). The latter is a Chinese species, and the parent of our noble Hollyhocks. These are particularly worthy of attention as good subjects for the tropical gardens, often growing from six to eight feet high in moist ground, blooming late in the season in great profusion. They will grow in almost any soil or situation, are increased by seed or division. Early spring

best time to sow seeds; the roots should be started in autumn after the stems are dried. A decoction of the leaves of our species is still much used in country districts for fomentations.

Thymus (Madwort).—There are several perennial species, all of which are like rock plants, but the following are by far the most showy:—*A. saxatile*, a grand plant, with bright yellow flowers, which are produced in panicles at the ends of the stems, seldom more than a foot high; it grows freely near the ground, spreading a considerable distance; blooms freely twice in a season, about May and September, continuing in good condition several weeks; native of Austria. *A. saxatile grandiflorum* is a magnificent variety of the preceding hardy plant. This is useful alike for the rocky, mixed border, or for flower-garden cultivation. Seen in a mass, no yellow, or flower-garden plant is its equal, and, with judicious management, might be had in the whole of the bedding season—yes, longer; succeeds in any good, well-prepared garden soil. *A. alpestris*, and *A. nemorosum*, both South European species, are the best for rockery cultivation, of dwarf habit and bloom freely about April or May. These species are propagated by seedlings. Seeds should be sown in March in a cold frame, or under a hand-lens and pricked out into a permanent position when strong enough to handle. Seedlings may be planted at any time of the year, care being taken to keep up a succession of flowering plants wherewith to replace any old plants which might die out from damp or other causes.

Atropa belladonna (Belladonna Lily).—A magnificent hardy bulbous plant is a native of the West Indies, on hill-sides near mountain streams; the flower-stems, which

are produced in advance of the leaves, are about 18 inches high, with from four to six flowers on a stem. The individual flowers are large purple or flesh-colour, and sweet-scented; they will continue a month or so in bloom, and create a grand feature in the flower garden, at a season when most plants now in use are seeking the protection of the glass department. A bed for the flower garden or a clump for the mixed border may be prepared as follows:—Remove the soil to the depth of 3 feet, or thereabout, allowing the ground to be drained previously; at the bottom of this place 6 inches of well-decomposed manure, filling in with a mixture of good garden soil, leaf-mould and river-sand. Plant the bulbs in April 6 inches apart every way, and the neck of the bulb 6 inches from the surface of the soil, after which the bed may be sown over with some hardy or half-hardy annual, whose blooming season would be past by the time the bloom scapes of the Lily made their appearance, which will be in ordinary seasons about August. From this time to the end of October the *Belladonna* bed will be the centre of attraction; nor is the interest attached to this plant ended here, for as soon as the plant has done flowering, the green leaves appear, and add fresh life and vigour to the scene, until tarnished by the storms of winter. The only protection required in winter is a coating of tanners' bark, or half-decayed leaf-soil, 3 or 4 inches in thickness. This, together with the decayed leaves, may be removed in the spring, after all danger from spring frosts is past, the surface of the soil stirred carefully and re-sown with annuals. The roots increase rapidly under favourable circumstances; the soil also will in due time become exhausted, so that it will be advisable to lift and re-plant every fourth or fifth season.—*Robert Bullen*.

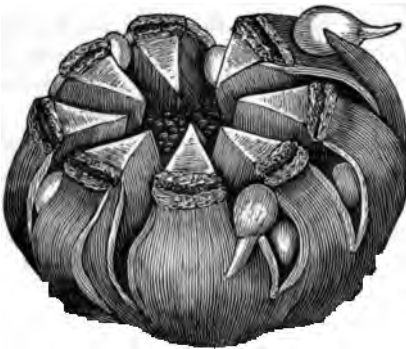
HOW THEY GROW BULBS IN HOLLAND.

HOLLAND, as all know, is exceedingly flat, with no natural drainage, and the water is pumped out of the country and into the sea by windmills. The sea is prevented overflowing the low countries by dykes or banks of earth. The water seems to stand generally within 18 inches of the surface, though in winter it is allowed to overflow the land. The fields are divided by ditches of water, and it seemed to me very strange that cattle were kept within desired bounds by such a narrow channel. Little portable bridges furnish the necessary gates, or means of passing from one field to the other. Most of the carting is done by boats, and it is no strange thing, as you look across the fields among the hay-makers, to see a sail apparently springing up from the mown grass, but really attached to a boat in some broad channel or ditch.

The soil is a black, peaty muck, somewhat freely supplied with sand. There are a few

greatest and most profitable culture ; it certainly requires the most care and skill. An acre of ground, three or more miles out of Haarlem, suitable for Hyacinth culture, I learned was worth nearly £200. Its preparation is a very costly operation. It must not be too high and dry, and yet it must be so high as never to be overflowed in winter. As all the meadows, and pretty much all the land, is flooded in winter, it is no small job to take an acre of this meadow land and raise it a foot or 18 inches above high water mark. It seemed to be prepared a little at a time, as leisure for this work permitted, though it must be done in the dry weather of summer. An acre or so is selected for the purpose, and its width staked out. Then trenching commences, and the trenching carried down to low-water mark. As this proceeds, sand from some of the Down hills and immense quantities of cow manure are mixed with the mucky soil. Of course, when the work is finished, there is a deep ditch at its termination, which serves as a fence.

If the piece of ground is somewhat isolated from the other bulb ground, there may be a ditch made on two or three sides, and of course the soil from these helps to raise the surface. The first year Potatoes are planted on this ground, and they grow of wonderful size, with haulms yards in length. They are, of course, worthless for eating, and are either sold to the Government to feed the poor soldiers or to feed the cattle. The bulb soil is manured with cow manure every other year, and the manuring is always followed by potatoes, so that a crop of bulbs is grown only every alternate year. Fresh manure will ruin the bulbs. Three classes of soil are prepared, and for different purposes. It takes at least three years for a young bulb to come of flowering or saleable size, and each year a different soil is required, so the ground



prepared to suit one or the other stages of growth. The soil for the youngest has a large proportion of sand, and as I examine now, it seems quite two-thirds sand and



Fig. 2—Bulb shewing base cut away.

one-third black muck. The soil for the second year's growth seems about half-and-half, and that for the third year only about one-third sand.

All who have had experience with Hyacinths know that little pointed bulbs are formed at the base of the large bulbs. These, after they get large enough to form roots, are removed from the parent bulb and put out to grow mature bulbs, which they will do in two or three years. These, however, do not furnish bulbs as fast as required, and re-

course is had to other methods to hasten the formation of young bulbs. One plan is to make cuts across the base of the bulb, as shewn in the engraving, fig. 1. This is done in June, after flowering, and the cut bulbs are replaced in the ground. They throw out around the cuts a great many young bulbs. They are planted in a mass without separation the first season, the second divided, and in three years make strong flowering bulbs.

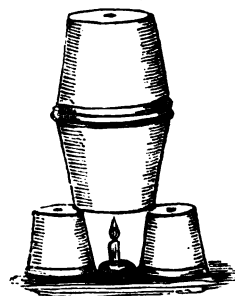
Another plan is to cut about one-third of the base of the bulb entirely away, leaving it somewhat hollow, as shewn in the engraving fig. 2. This is not done until July or August. By this process an immense number of young bulbs are formed from the cut scales, but not as large in size as by the previous process. This plan gives the greatest number, but it takes longer to bring them to perfection—usually four years, and occasionally longer. Some varieties succeed best by one process and some by the other. New sorts are, of course, grown from seed, and seedlings bloom the fourth year, and it takes many years to get up a stock of any new variety.

The soil is so porous that no tool or implement is used in digging, and experienced workmen rake the bulbs out of the mellow soil with their hands much faster than one could count.—*James Vick.*

A CHEAP FUMIGATOR.

Every professional gardener knows how to smoke or fumigate a plant-house, but it often puzzles the amateur how to do it. There is besides, a certain class of men calling themselves gardeners, who surely do not understand the method, or we should not so often see house-plants so covered with aphides, &c. Moreover, we are quite certain that no gardener could endure seeing his plants thus poisoned. To fumigate a house is the simplest matter possible. Get four flower-pots—two small and two a good fair size, in proportion to the work to be done. Set the small pots bottom upward, a small distance apart; get a few live coals in one of the larger pots and set it on the bottoms of the small ones; this will leave the hole in the bottom clear for draft—put tobacco paper on the hot coals—turn the other large pot bottom upward on the one containing the tobacco, &c., and it

will burn right away. Another plan is, not to use fire, but instead, a short piece of candle stuck in a piece of clay placed beneath the hole of the pot containing the tobacco. Be



A cheap Fumigator.

sure the foliage of the plants is dry, that the house is cool, and that the tobacco does not blaze, and no harm will be done unless the quantity used be excessive.

A GARDENER'S STOOL.

Any invention which eases or facilitates the labour of gardening is sure to be acceptable to villa gardeners, and especially those who cultivate their gardens with their own hands. The stool which we now illustrate we saw in use in the market-garden of Paris upwards of twenty years ago; but it has been appropriated by an American inventor, and is now sold in the United States. It is a simple and effective device, and is well adapted for the use of gardeners. It is made of wood, and is of a simple and effective design. It is well adapted for the use of gardeners, and is a valuable addition to their tools. It is a simple and effective device, and is well adapted for the use of gardeners. It is made of wood, and is of a simple and effective design. It is well adapted for the use of gardeners, and is a valuable addition to their tools. It is a simple and effective device, and is well adapted for the use of gardeners. It is made of wood, and is of a simple and effective design. It is well adapted for the use of gardeners, and is a valuable addition to their tools.

as a milking stool, and perhaps for other purposes where it is desirable to avoid the



Gardener's Stool.

continued or often-repeated stoop-

IMPROVED GRAFTING TOOL.

The invention consists in the combination of a saw, A, splitting knife, C, and a wedge, E. The instrument is used by taking hold of the handle, D, in the usual way to saw off the stock. The instrument is reversed, and the splitting knife, C, is used to split the instrument. The wedge is driven by striking the head, H. Thus all the tools used for grafting, except the handle, D, in the usual way to saw off the stock, are combined in a single tool, a

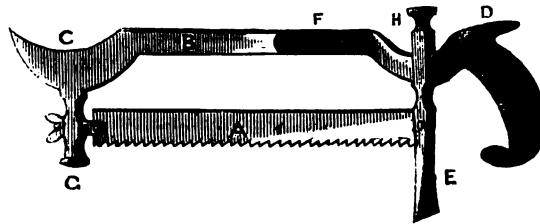


Fig. 108.—Improved Grafting Tool.

the stock. The handle, F, is used to place great convenience where trees are to be the knife, C, properly, and the head, G, is climbed in the performance of this kind of struck to split the stock. The stock being work.

The Veterinarian.

TREATMENT OF FOOT-AND-MOUTH DISEASE.

MORE than once, says a writer in the *Field*, we have taken occasion to advocate the system of non-interference in dealing with the vesicular disease, but there is a general and natural objection to stand idly by and see animals suffer unrelieved, so that it usually comes about that the sick subjects are well doctored in spite of all warnings to the contrary. Our advice has always been to the effect that foot-and-mouth disease must run its course if it is to end favourably, and hence the desirability of not using violent remedies, which may interrupt the development of the several stages of the affection. Treatment of all diseases, to be effectual, must be based on a knowledge of the natural progress of the affection to its termination; and the object of the remedies should be to assist this natural course rather than to arrest or divert it, at least in the majority of instances, and certainly in the case of foot-and-mouth complaint.

When uncomplicated with other maladies, the disease tends to terminate in a restoration to health. It is not unusual in the present day to hear the statement from practical men, that foot-and-mouth disease leaves some mischief behind, and that animals which have recovered from an attack are never so healthy as those which have not been affected; long experience of the effect of the disease contradicts this statement, and really even indicates that the disease is a purely local one, and that it does not leave any permanent mischief behind.

The disease is, however, very often complicated with other ailments, and in such cases the treatment must be directed to the removal of the complications as well as to the relief of the disease itself. In such cases, the use of remedies which are purely symptomatic, and which do not interfere with the natural progress of the disease, is the only safe course to pursue. The use of violent remedies, which may interrupt the development of the disease, is to be avoided.

which cause derangement of the function of nutrition; but all these are exceptional terminations, which may be more numerous in certain seasons, but cannot be classed among the usual results of the disease.

Foot-and-mouth disease belongs to the eruptive disorders, the eruption being the outward expression of the poison which has been introduced into, or developed in, the animal's system. If the precise nature of the virus were known, it might be possible to neutralise it by chemical means; but as it is not so known, the next best course seems to be to prevent or assist the expulsion of the morbid material by the ordained channels.

The first step to be taken when an outbreak of foot-and-mouth disease occurs, is to place the sick animals under favourable sanitary conditions. Pure air and water, and easily assimilable nutriment, are three essentials. Protection from the weather will be provided according to the season; if the temperature is moderate, the animals may be kept at pasture, always providing that those which are badly affected in the feet can be penned so as to prevent them taking much exercise. Water may be supplied *ad libitum*; food should be given according to the circumstances of each case. So long as the animals can crop the grass, or eat hay and roots, no artificial food is necessary; but when the appetite is lost, and the soreness of the mouth renders eating painful, and so causes the animal to refuse food, considerable care is required.

When the animal is unable to take food, nursing is, under the circumstances, an indispensable, and cannot be replaced by medical treatment. Soft, moistened pulped roots, should be placed within the animal's reach. Sometimes the food may be placed in the mouth gently will be accepted, and the act once commenced will

continued. Oil-cake in small pieces, though an apparently unpromising diet, has been taken in many instances when it has been carefully introduced into the side of the mouth and pushed back towards the teeth. Gruel and linseed tea are only used when solid food is persistently refused; and in giving either of them by means of a horn, or bottle, great care is required to avoid injuring the tender mouth.

Surgical treatment in all cases which are passing regularly should be purely local. The sore mouth may be washed with a lotion composed of potash, made by dissolving one ounce of the salt in a pint of water; and the under feet may be syringed with a solution of common nitre, made by dissolving an ounce of nitre in half a gallon of water.

At the same time that this treatment is carried out, all the animals of the herd should be placed under the antiseptic influence of sulphite of soda, or carbolic acid; and as agents, it may be said, have proved efficacious in the treatment of the disease. Sulphite of soda is easily administered in the drink-water, about half an ounce being added to a gallon of water or more, the quantity being so arranged that each animal should get about two ounces of the hyposulphite per diem. Carbolic acid may be used in the form of vapour, the atmosphere being saturated with the acid, as described in the preceding paragraph of this article.

If the fever become very acute, as attended by high temperature, hot and dry skin and horns, with redness of the visible mucous membrane and constipation, saline purgatives may be cautiously administered. The dose should not exceed eight ounces of the decoction of soda or magnesia, and if it is not necessary to repeat it, not more than the same quantity should be given; the use of the mouth lotion and wash for the throat will also be continued. Ulceration of the cretting membranes of the feet will require the application of caustic: carbolic acid undiluted, is very effective for this purpose.

A dressing of tar may be afterwards applied, and some kind of bandage may be used to prevent movement of the

loosened horn, otherwise complete separation of the horny covering may take place, and the animal be crippled for weeks.

It may be necessary to remark that while foot-and-mouth disease will, in the majority of cases, terminate favourably, great skill is required in the treatment of those instances which tend to assume a virulent form; in no disease, in fact, is the aid of a competent veterinary surgeon more indispensable.

Foot-and-mouth complaint is a malady which, according to its varying aspect, either requires no treatment at all, or the most skilful management; and the failure of stock-owners to recognize this fact is the cause of a great deal of mischief.

First on the list of preventive measures stands "isolation," not merely the separation of the animals from other herds, but the placing them in a position so secluded that no communication, even of an indirect kind, shall take place between them and the outer world. A herd so situated will have, according to its size, one or more attendants, who will be required to refrain from visits of inspection to neighbouring farms (in the cattle plague time a vigilant farmer would not allow the stock men to leave his farm at all). No curious investigator on any pretence will be permitted to examine the animals; dogs will be forbidden to enter the premises on pain of death; and all fat stock will be sent to the butcher, or to the market, *never to return*.

So far the recommendations are simple, and in most cases easily carried into effect. We are aware, however, of circumstances which in certain localities render isolation impossible. In great grazing districts there are sometimes small homesteads which are widely scattered, and quite inadequate to the accommodation of a third of the stock, which graze on the land all the year round; in such positions isolation cannot be effected, and an infectious disease once established among the cattle in the open grounds—say, for instance, in central Somerset—runs its course in simple obedience to the laws which govern the spread of epizootics. If we are asked for a specific which will render the animal's system proof against infection in such a case as this, we

must candidly confess that we have none to offer.

Next in importance to isolation is disinfection—surrounding the animals with an atmosphere which is capable of neutralizing the poisonous influence of the virus, should it obtain an entrance to the place in which the cattle are confined. This may be done to some extent by the use of carbolic acid, or chloride of zinc, or sulphurous acid; but carbolic acid is the most manageable and least dangerous compound for the purpose. The air of the cow-shed may be sufficiently charged with the acid by sprinkling the

liquid about the floor; or, better, by mixing one pint of carbolic acid with forty or fifty parts of water, and saturating with this solution a quantity of sawdust, which may be spread over the floor of the shed. Cloths dipped in the solution may also be hung near the windows and doors. As an additional precaution, quicklime may be spread at the entrance to the shed, in order to meet the possible danger of any one entering the place after treading on manure of infected animals. By adopting these precautions as a system of daily routine, the stock owner will do all that can be done to prevent infection.

The Dairy and Poultry-Yard.

IMPURE MILK; HOW CAUSED AND ITS INJURIOUS EFFECTS.

MR LIVESEY, of The Brick, Poulton-le-Fyloe, sends the following communication to the *Chester Chronicle*. Some account of Mr Willard's observations has appeared in the Magazine on previous occasions, but a good story cannot be too often told.

Few countries have made such rapid progress in improving the quality of their cheese during the last twenty years as the Scotch. It was a happy decision to adopt the Cheddar method; indeed, that mode is now getting introduced in Cheshire and Shropshire, and other counties—a proof of its superiority. I do hear in certain quarters that some of the Scotch Cheddars do not keep their flavour pure and true for such a lengthened period as they formerly did. This ought not to exist, and where it exists a cure should be sought: it is the one great drawback with American cheese; but with them, their great aim is to force the cheese into the market for consumption at the earliest possible moment. Another remark I hear is, that while some Scotch makers have reached a standard of excellence not before attained, the market is *always overstocked* with a quality best described as “*neither good nor bad*.” I am only an occasional visitor, and just report what I hear, not in a fault-finding spirit, but to stimulate improvement. I do know that the majority of the Scotch cheese makers are anxious to improve and willing to learn. And knowing this, on reading a paper—published in the *Journal* of the Royal Agricultural Society of England, by X. A. Willard, of Herkimer, New York—I have ventured to make some extracts which may possibly be of use to your readers. I know there are some places where they will be useful, and presuming they may be so in Cheshire, I send

them to you. Mr Willard is a writer of celebrity in connexion with cheese-making and other agricultural matters, and the paper I am extracting from is a long and very interesting account of the operations in the American milk-condensing factories, especially the most celebrated one—that of Mr Borden, at Brewster, New York, where about 10,000 quarts of milk are condensed daily. At some future time it is just possible the Scotch may turn their attention to the milk-condensing manufacture. There is a factory for that purpose at Aylesbury, Buckinghamshire; also, one at the Mallow, Ireland, where I notice the proprietor, Mr Newnham, is testing the question as to whether cheese can be successfully made in Ireland, which has of late years been so largely supplied from Scotland. But I must pass over the particulars of the milk-condensing processes and come at once to the purpose of this communication, which is to give a clue to the cause of the great difficulty which occurs sometimes in dealing with milk in making cheese.

Mr Willard observes: “In Mr Borden's early experiments, and indeed up to within a few years past, the nature and cause of a peculiarly bad behaviour of milk from time to time were imperfectly understood. Under certain circumstances and conditions the milk could be readily handled, and gave no trouble in its manipulation. When in this state, comparatively inexperienced operators—men who simply followed a set of rules, with little or no knowledge of principles—were enabled to turn out a good product, whether it was condensed milk, or butter, or cheese. Sometimes these conditions would continue for days, for weeks, and for months.” Then we are told there would be a sudden and

unaccountable change, and this at first was attributed to want of cleanliness, which indeed is sometimes the cause; but experiments and facts proved that besides cleanliness (which is most imperative in dealing with milk at every stage) there were other causes at work, and one of these was *the presence of fungi* in the milk. Mr Willard quotes from Professor Caldwell as follows:—"It is one of the most commonly observed facts of nature that milk is especially susceptible to the influence of emanations from putrid matter. The germs of fungi that are continually thrown off from foul or putrifying matter find in the milk a place where they can go on and multiply; *and so insidious are these influences, so readily can these minute germs make their way anywhere and everywhere, that if the air containing them in unusual quantity is inhaled by the cows, the milk will be infected before it leaves the cow's bag.*"

The last sentence, which I have put in italics, should be indelibly fixed on the memory of the reader, as well as the following: "From the moment the milk leaves the cow the work of the fungi commences; they begin to increase and *simultaneously the milk begins to change*, both operations going on with a rapidity that varies according to the circumstances of temperature and exposure." As a specimen of the rapidity with which fungi can increase and multiply—and, of course, injuriously affect the milk—we are told that one spore of the "*Penicillium crustaceum*" will, in the course of an hour, at a moderately elevated temperature, produce 50 to 100 *Micrococcus* cells; each one of these cells will sub-divide into two in another hour, and so on. At this rate of increase we should have, at a low estimate of 40 cells to one spore, to start with, 400,000,000 *Micrococcus* cells from this one spore in twenty-four hours." After this, need any one wonder that milk thus affected should make bad cheese or bad butter? The fact of the presence of fungi in milk is made indisputable by numerous well-authenticated cases. In one instance the fungi were introduced from minute particles of mud which had got upon the cow's udder when it had crossed a

mud pond. And how often, in a hot day, do we see cows when being driven up for milking, plunged into mud ponds or foul ditches? Another instance given is where the cows inhaled the foul odours proceeding from a dead animal. The following case I quote at length and commend to the careful reading and thoughtful consideration of all interested:—"Another case in point occurred during the past summer—1871. Professor Law, of Cornell University, gets his supply of milk from a 'milkman.' One day, during the hot weather, he observed a peculiar ropey appearance in the cream which had arisen from the milk. He examined it under a powerful microscope, and *found it filled with living organisms of a character quite foreign to good milk.* He immediately called upon his milkman, to inquire concerning his management of stock and general treatment of milk, with a view of accounting for the trouble. There was no fault discovered at the dairy-house, in the milking, or in the treatment of the milk; but on looking through the pastures he found that the cows, for lack of clean running water, were compelled to slake their thirst for the most part from a stagnant pool. This water he examined under the microscope, and discovered the *same class of organisms as those in the cream.* He then took some of the blood from the cows, and examined under the glass, when the *same organisms made their appearance.* He next obtained a specimen of good milk—milk which, on examination, was free from impurities, and into this he put a drop of water from the stagnant pool. In a *short space of time the milk developed an infinite number of these organisms, and became similar in character to the milk obtained from his milkman.*"

I will not quote more instances, but merely add a case which came under my own observation. It was at a farm-house where the place of the window in the dairy was of open lattice work (as is often the case for ventilation and coolness), and outside this lattice opening was a foul rubbish heap. While that remained, bad cheese was made; after it was removed, the cheese produced

was of first-class character. Milk is so very sensitive to foul odours, whether as above, or from badly-laid milk house floors, rendering the air sour or impure, or from whatever cause, it is imperative and indispensable to prevent the milk from being in any way ex-

posed to injurious influences. This is an important matter, but one which has had too little attention paid to it; and if the contents of this letter should secure, where it is wanted, the much needed reform, I shall feel I have occupied your space to good purpose.

THE COMPARATIVE PROFITS OF BUTTER AND CHEESE.

IN a paper read before the Coldwater (Michigan) Farmers' Club recently, by Mr A. J. Aldrich, the following passages occur:—

In speaking of the profits of cheese compared with butter, I have only one comparison to make, that is, with the average price of cheese and butter as received by farmers generally. The care of stock, and of milk, so far as cooling and cleaning are concerned, is the same whether we make cheese or butter. But there are many other things in making butter which take extra time and labour in doing them that can be dispensed with in making cheese. There is no setting of milk, there is no skimming, there is no care of the cream, and no working of the butter. After it leaves the milk-can the care of it may be at an end, so far as the farmer and his wife are concerned. Indeed, the expense of making butter is double that of making cheese. The price for manufacturing cheese at our factories is $1\frac{1}{2}$ d. per lb., while the price for making butter is $2\frac{1}{2}$ d. per lb.

The question now is, how much milk will it take to make 1 lb. of cheese as compared with the quantity to make 1 lb. of butter? Of course it will vary with different seasons and even with different days. The amount of milk used in making 1 lb. of cheese varies from 9 lb. to 11 lb.; to make 1 lb. of butter from 25 lb. to 30 lb. of milk. The result will prove that we can make from $2\frac{1}{2}$ to 3 lb. of cheese where we can make 1 lb. of butter.

During all the past year butter has varied from 5d. to 11d., while the price of cheese

has varied from $4\frac{1}{2}$ d. to 8d. per lb. During the months of July and August it will take from 30 lb. upward of milk for 1 lb. of butter. Indeed, I imagine that not many farmers will make 1 lb. of butter from less than 35 lb. to 40 lb. of milk during the summer. I do not make this statement rashly, but on the authority of Hon. Zadock Pratt, who began the dairy business in 1857. He made butter, and for eight months it averaged over 39 lb. of milk for 1 lb. of butter. He was supplied with all the conveniences necessary to good butter-making. If it took that amount with all his facilities, what would it take with the ordinary facilities of the average farmer? I think I would be perfectly safe in saying that the average farmer will not come up to the average of Mr Pratt in that respect. If that is the case, the milk that will make 1 lb. of butter will make nearly or quite 4 lb. of cheese. But for the sake of placing the matter in as favourable a light as possible for the average farmer, I will take 3 lb. of cheese to 1 lb. of butter, with the proportion and the average price of butter at 8d. and that of cheese at $6\frac{1}{2}$ d., we shall have 1s. $7\frac{1}{2}$ d. for cheese where we should receive 8d. for butter. In one case 30 lb. of milk brings 8d., in the other it brings 1s. $7\frac{1}{2}$ d., difference in favour of cheese of $10\frac{1}{2}$ d. If we discount the price of cheese-making, we have $5\frac{1}{2}$ d. in favour of cheese. But we will take cheese at the lowest price and butter at the lowest price, and see where the balance rests. We said that $4\frac{1}{2}$ d. was the lowest price for cheese. 3 lb. of cheese would yield

1s. 1½d., and 1 lb. of butter 8d., or 5½d. in favour of cheese. Deducting the price of manufacture, and we have 5½d. for butter and 10d. for cheese, or 4½d. in favour of cheese. I am sure no one could ask for a fairer comparison than this, and the experience of dairymen will carry me out in these deductions.

Upon this basis let us see what the profits will be on each. It is plain enough to be seen that they will be in the same proportion as the price received for butter and cheese, consequently the profits favour the manufacture of cheese. I will take one example from our milk account with our patrons at the factory. Mr B.'s cows, in three months and five days, yielded 16,554 lb. of milk, or 1622 lb., which made 1622 lb. of cheese. This brought, say, £42, 3s. 6d., or

a little over £6 per cow. If he had made butter it would have produced 551 lb., which at 10d. per lb., would have brought £22, 5s. 3d., or £3, 12s. per cow, making a difference of nearly half in favour of cheese. Deducting the amount for manufacturing, and we would have received for cheese nearly £34, 2s., for butter nearly £16, 16s., per cow for cheese, in round figures, £5, 18s., but for butter £2, 8s. 6d., or more than twice as much for cheese as butter. This is only for half a season. Had we made six months he would have received £12, 3s. per cow; deducting the price of manufacture and he would have received £10 per cow. The first season was the most favourable, as the drought of the past year has lessened the flow of milk materially, and the price of cheese has been considerably less.

The Naturalist.

SALMON BREEDING AT INVERTROSSACHS.

THE experiment which is being made at Invertrossachs for the propagation of salmon, says the *Scotsman*, is proving most successful. Some time ago we mentioned that Mr Stewart Macnaghten of Invertrossachs, having experimented with trout, was desirous of extending the process to salmon, and applied to the Forth Fishery Board in October for permission to get a quantity of salmon ova. Leave was granted, but it was not till the season before attempts were made to obtain ova, the result being that about 3000 ova could be got. The portion of this was deposited in six glass-boxes, sent down by Mr. Neville, Clifton Gardens, London, and fitted up in Invertrossachs House, and the reservoir was placed in two boxes about 200 yards from the house, where two small ponds were formed. These ponds, which are about 10 feet, are situated close to a stream which runs into Loch Vennacher. Water is supplied to them from this stream, and after passing through the ponds it again enters the stream. To prevent anything from the ponds which would be likely to interfere with the young fish, the stream is enclosed at its entrance and exit by netting so that the fish cannot escape. A wire fence has also been erected round the ponds. The process of hatching the ova commenced on the 96th day, and was completed by the 100th day—the end of March. The young salmon were then removed from the breeding-boxes and ponds, and there they are progressing favourably. In length, at the present time, they vary from $1\frac{1}{2}$ inch to 3 inches,

those who take the food thrown in by the keeper seeming to thrive best, though a number seem to prefer the stray flies which come in their way.

Mr Macnaghten has preserved a number of interesting specimens at various stages. In one small phial is a specimen of the ova when spawned; in another phial is a specimen shewing the eyes of the fish as they appear in about 59 days; in a third is the young fish just as hatched in 100 days; in another is seen the fish when seven weeks old. This last-mentioned specimen is about one inch in length, and has the bar marks most distinct. It was taken just at the time when it had become disencumbered of the umbilical bag. Several curious specimens of salmon deformities are also preserved. One has the tail and one half of the body turned up over the back; another has the tail turned in alongside the umbilical bag; a third has the whole body something in the form of a corkscrew, turned over the back of the head; a fourth has the body turned to one side; and the fifth has the body quite distinct, but the tail is turned down underneath the umbilical bag.

From the success which has attended this attempt at salmon propagation, we understand that next season Mr Macnaghten will experiment on a larger scale, so that there is every likelihood of the Forth district of salmon fishings becoming much more valuable than they already are. It is not improbable that the experiment will embrace sea-trout as well as salmon, and as the Fishery Board will likely follow the example of the Tweed Board in marking a number of the young fish by means of wire inserted in the tail, the

vexed question as to whether the "yellow fin" is the young of the sea trout or the young of the common yellow trout may be finally solved.

In carrying out the experiments, the most difficult part seems to be how to get the young fish in the smolt stage safely sent on their journey to the sea. It is easy for the fish to be led from the ponds into Loch

Vennacher, and instinct will lead them towards the lower waters; but they have a most formidable enemy in the pike, which are found in great numbers in the loch, and it is possible that some means may be adopted for carrying the smolts from the ponds to Vennacher water below the loch, where their prospect of reaching the sea is much more favourable.

THE RURAL GENTLEMAN'S MAGAZINE

NOVEMBER 1872

IRISH TENANT-FARMERS AND THEIR LABOURERS.

CORRESPONDENT of the *Daily News* gives an interesting account of the condition of the small tenant-farmers of Ireland and their labourers. We had thought since 1862, when we drew attention to the deplorable state of the Irish peasantry, that the order of things had since then given place to a better. Our remarks on the subject were referred to the country between Dublin and Merick. "The dwellings of the agricultural labourer," we said, "are generally wretched, though there is manifest improvement going on—a neat whitewashed, painted, tolerably high-roofed, and skillfully-natched cottage, taking the place of a mud or dry-stone built cabin, with a low and straw-patched roof, and cracked floor—a broken-backed thing, with a slight and no chimney, and sitting in a Poverty-stricken creature wade bare-through the puddle at the door, or sit vacantly at the passing train over a dilapidated wooden half-door, which he has to keep in the 'childer' and to shut out the pig." Where this precautionary measure is not adopted, you may see hounds playing at mudlarks in the puddle, the pig taking 'his aise loik a gintle' in the door-way." If we are to accept the account given by our contemporary's correspondent—and in view of possible disbelief in statements the writer gives emphatic assent to the truth of the picture—social improvement is making very slow progress in all districts of the Emerald Isle. It is

to be hoped that Irish landlords will move more energetically with a view to effect reform than they seem to have done during the past ten years. The following is the account referred to:—

The County of Cork is essentially a dairy district, possessing an agricultural industry in the manufacture of butter. The genuine Irish farmer, be it known, has a great aversion to hard work, and the several people dependent upon him, whether men, women, or children, appear to have the imitative faculty very strongly developed in that direction. One consequence is that the farmer does not generally make his own butter, but lets his cows to a butter-maker, and the whole of his farming operations are conducted on the same principles. As a specimen, we may take an honest, sober, lazy occupier of about 60 acres, who has been on the verge of bankruptcy for some years, and has been kept afloat by the assistance of a rich brother-in-law. The appearance of this man would not disgrace the professional "casual." His outer garments had once been frieze, but what with holes and rents, patches and darns, the original material would have been difficult to discover, but for the fact that it still constituted, so to speak, the framework of his habiliments. As to underclothing, apparently he had none; and his hat would have made the fortune of an "Irish comedian" at a low-class music-hall. This man's farmhouse was approached by an almost impassable occupation road,

ant signs that some portion of the land it is owned by noblemen and gentlemen who are known as "improving landlords." Wherever one sees a ruined hovel, a naked gable, there one is tolerably sure a miserable bankrupt farmer has left the ry, to his own benefit and that of either landlord or his neighbour. Where these of a diminished agricultural population are most abundant, they are associated with drained fields, recently "squared", better farm-buildings and occupation, and every other sign of active improvement in the productive powers of the ry, and in the condition of the people whose labour it is achieved. But the farmers who are employed on such works do not have a far different remuneration from the farmer's labourer whose condition we have sketched. The rate of wages paid by improving landlords in the districts to which I refer, ranges from 9s. to 12s. per week, according to the age and capabilities of the men; unfortunately, in a good potato year a large number of them prefer the easy work to low wages of the farmer, to the harder and higher wages of the landlord. This is true, however, it is quite different, and reflects on the landlords already beginning to see in some measure the nature of the problem that lies before us all. The labourers' movement are commencing their crusade, in the hope of either inducing the landlord to buy their husbands, or of compelling their landlords to move into an urban district. I accompanied a gentleman in a visit to one of his best tenants with a view to

induce the farmer to give his labourer more wages. The wages had been, as already stated, 3s. per week, and the man's keep, with the deductions of 6d. per week for the house and another 6d. for the potato-land. The request of the landlord was that the wages should be raised from 3s. to 5s. Reasoning and persuasion were alike useless, for the tenant had but one reply to both, "Shure, your honour, and is it the likes of me that can afford to give 5s. a-week?" This was no solitary instance, and it was almost exhilarating to find that one poor woman, at least, had succeeded in getting a situation for her husband at increased wages.

The remedy for the hardships of the coming winter cannot, therefore, be found on the farms of the small tenants, but must be discovered, if at all, on the undrained and unreclaimed lands of the owners of the soil. A drive through such a district as the one we recently visited, is sufficient to shew that there remains an abundance of works of improvement, such as draining, fencing, and road-making, that will in the end repay the outlay. If done at this crisis they will be a real charity to the farm-labourers' families, who have depended upon the potato-crop for their sustenance, and if now planned by Irish landlords and their agents, the mistakes of 1846 need not be repeated in any case. The result would be to avert the famine that now threatens the agricultural community in the outlying districts of Ireland, and to add to the productive powers of a country which is sadly in need of the application of capital to the soil.

THE IRISH LAND ACT.

AN important speech on the above subject has been delivered at an agricultural dinner in the county of Cavan, by Lord Lisgar, ex-Governor-General of Canada. The speaker, an Irish landlord, well acquainted with the views and opinions held by his countrymen, had but recently returned from the occupation of a post which gave him an excellent opportunity of learning the true condition of a country which forms no inconsiderable portion of that great Western continent whither so many Irishmen have in past times turned their steps, and to which many still look as affording the only field open to them in which they can effect an amelioration of their condition. The speech was delivered at a dinner given by the Marquis of Headfort to about ninety of his tenantry at the close of a cattle show, the competitors at which consisted exclusively of his lordship's tenants, while the prizes were his lordship's gifts. Lord Lisgar was called on to respond to the toast of "The Lord Lieutenant and Prosperity to Ireland." Having remarked that Earl Spencer possessed all the qualifications and all the accomplishments which were necessary for the discharge of his exalted functions, Lord Lisgar briefly referred to his career while representing the county of Cavan in Parliament for twenty years. Now, after a long absence from Ireland, he had returned to it, and he was happy to think that he found it prospering and increasing in material wealth.

equity on which the Land Bill was founded, and they would also see that the principles had been embodied with the most admirable skill and patriotic views in legislation by Mr Gladstone. No doubt, in so great a measure there might be difficulties and differences of opinion. At the present moment differences existed, for no doubt some people thought a very great change had been effected. Now, he had given his very best attention to the measure, and, speaking of it as it is, he was perfectly confident that before many years elapsed it would be found that the extent of the changes effected was very much smaller than they had anticipated, and that, while it gave security on one hand, it did not alter the relations between landlord and tenant. He believed that, after some little further experience of the working of the Act, the results would be found to be most satisfactory. If it were necessary for the proper and uniform working of the Act that a declaratory Act should be passed by the Legislature, that course ought to be adopted; but he did not think such action would be required, for he believed if the law was accepted in the spirit in which it was passed, it would be found that the landlords lost little on the one hand, that no landlord would be debarred of any right before claimed which just men would have enforced in times past, and that though tenants have greater security, they will not, on their part, claim more than they have been accustomed to in times past. If the law were received as it ought to be—frankly—by the landlords, and in the same spirit as the tenant-right and goodwill had been accepted and worked on such estates as the Duke of Abercorn's, the Marquis of Downshire's, and on this Headfort estate for times past, and if, on the other hand, tenants claimed nothing more than they had been accustomed to, and which the law means them to have—if they did not allow themselves to be led astray by those who only sought to create contention, and if the two parties stood firmly and fairly on their own ground without encroachment—all would then be right.

Lord Lisgar then referred to the question of emigration. He did not believe that the Land Act would affect emigration one way or the other:—

...the young, strong, and hopeful would naturally go abroad with the view of bettering their condition, while those who were contented with their condition in Ireland would remain, as they had done in times past. What would really stay the tide of emigration was the gradual assimilation of the wages

...the young, strong, and hopeful would naturally go abroad with the view of bettering their condition, while those who were contented with their condition in Ireland would remain, as they had done in times past. What would really stay the tide of emigration was the gradual assimilation of the wages

and advantages enjoyed in Ireland to the wages and advantages enjoyed in Canada and the United States. They were now nearly on a par, for he saw in a Transatlantic paper that the farmers were holding out against giving their labourers 5s. a-day, and he knew that no man could be got to mow hay for less than 4s. a-day at Bailieborough. He also knew that 4s. a-day here were worth more than 5s. a-day there. It was idle to talk of depopulation of the country, or of one class forcing another to emigrate. Why, he ventured to say that if they had a prize proposed for landlords who wished that people should emigrate, and that wages should be augmented, the judges would have a precious small class to adjudicate upon. It was the interest of every landlord that wages should not rise very high, and therefore, it was their interest so far that emigration should not be pushed forward. It was also idle to speak of depopulation of the country in that sense, or to say that the landlords and tenant-farmers wished to see the people leave the country. Only those leave Ireland who think they have a better opening in those other countries than is to be found in this. The idea of supposing that it is in the power of any man or any set of men materially to alter the conditions of agriculture, or to alter the state of the markets, was one of the wildest and most imaginary that could be laid down. What is happening in Ireland now was the converse of what happened at the close of last century and the beginning of the present. At that time there was a very high price on grain, and the prices of cattle were low, for the reason that steam navigation had not then come into force, and there were not the same facilities for transporting cattle to England. The

grain, however, was high in price and was easily transported. The consequence was that a great deal of land was broken up, and with the great subdivision of farms, the population was greatly increased. Now, however, the conditions were all altered. The cattle were easily transported to the English market, while the opening of the English market to the grain of the whole world had reduced its price. There was no means, however, of keeping down the price of cattle, and, consequently, it was much more profitable to have cattle than grain in this country. The farmer bought out his neighbour because he wanted to have a larger farm; it was not that the landlord wished to turn the tenant out:—and the man who was bought out went willingly and contentedly away with the money he had got to seek his fortune elsewhere. That was what was going on at present, and blame could not be laid at the door of any class. It was even beyond the power of legislation, for if legislation were invoked it would only produce, as in many other cases, precisely the opposite results to those which it was called in to effect. He trusted the farmers in Ireland would not seek relief in any measure of legislation to further their efforts, but would depend on their own exertion, and that they would remember what was as wise course as was ever given to a nation—the counsel of the merchants of France to the greatest Minister of the day, who wanted to know what he could do for them—“Let us alone.” So it was with the traders, or farmers, or fishermen who were now making an outcry in Ireland; the best thing the Government could do was to let them alone—give them a fair field and fair play, and leave them to their own ingenuity and their own efforts.

IRISH AGRICULTURAL STATISTICS.

THE Registrar-General has now furnished the complete “General Abstracts” shewing the acreage under the several crops and the number of live stock in each county and province in Ireland in the current year. There had been issued in advance a return of the acreage under flax, and, more recently of the number and value of the live stock. The present returns give more details as to the live stock, and for the first time, the area under crops of all kinds during the current year. There is also a tabular return of the total area under the several crops for the last five years. From the last mentioned return it appears that the acreage under wheat has steadily

decreased since 1868, the figures for the five years being 285,150, 280,460, 259,846, 244,451, and 228,189 acres respectively. Thus, in 1872 the acreage under wheat is fully one-fifth less than it was in 1868. Oats also shew a steady and continuous reduction during the same quinquennial period, although only to the extent of about 5 per cent., the figures for the five years being 1,701,645, 1,685,240, 1,650,039, 1,636,136, and 1,621,813 acres respectively. The acreage under barley had increased from 186,318 acres in 1868, to 218,894 in 1872, although the latter year is less by 22,391 acres than the year 1870. Potatoes during the first four

years of the quinquennial period kept close to one figure—viz., about 1,040,000—but this year the acreage has (fortunately, perhaps) decreased to 991,802. Turnips this year shew an increase of 19,429 acres, and the breadth under this crop is 7000 acres in excess of that of any of the last five years, while it is upwards of 26,000 acres in excess of that of 1868. The acreage under mangold and beetroot has increased each year, the extent now being 34,920, as against 31,921 in 1871, and only 19,109 in 1868. Cabbages, carrots, and other green crops shew also a considerable increase.

The acreage of flax, on the other hand, was, during the five years commencing 1868, as follows:—206,483, 229,252, 194,190, 156,670, and (in 1872) 122,003. The acreage under meadow and clover this year was 1,799,930, being in excess of the amount in any of the preceding four years, except 1871, when the acreage was 1,829,044. The total extent under crops in 1872 was 5,486,522 acres, the entire area of Ireland being (exclusive of the larger rivers, lakes, and tide-ways) 20,325,693 acres. The 15 million acres not under crops are divided as follows:—Grass, 10,241,513 acres; fallow, 18,512; woods and plantations, 325,173; bog and waste unoccupied, 4,253,973. The corresponding figures in 1871 were 10,071,285, 20,620, 324,998, and 4,287,361.

It will thus be seen that the extent under grass has increased by upwards of 170,000 acres within the year, while the bog and waste unoccupied have been reduced by upwards of 33,000 acres.

The returns of live stock for 1872, when compared with 1871, shew an increase in the number of horses of 2650; of cattle, 80,781; and of sheep, 28,682; and a decrease of pigs amounting to 236,037. Taking the years from 1862 to 1872 (inclusive) it appears that the number of horses steadily decreased from 602,894 in 1862 to 524,180 in 1867, while since there has been a continuous increase, the average increase being about 3000 yearly. Cattle have shewn, almost uniformly, an increase during the eleven years, the number in 1862 being 3,254,890, while in 1872 it was 4,057,153—the largest number during the whole period. Sheep now number about 600,000 less than in 1867 and 1868, but they are still much in excess of the number in 1862, which was 3,456,132, while in 1872 the number was 4,262,117. Pigs, which number 1,385,386, although much fewer than last year, are considerably in excess of the average of the eleven years.

The emigration tables shew that in the first seven months of 1871 the returns of emigrants from the several ports of Ireland indicate that 49,155 persons left this country. The number for the same period in 1872 was 54,995, being an increase of 5840 persons during this year. On the question of labourers' dwellings, the Registrar-General, when the ploughshare comes against any of these states that the number of fourth-class dwellings in Ireland in 1871, each of which had but one room for the entire family of every age and each sex, was really much "less than" the number in 1861, when it was 89,374.

THE AGRICULTURAL LABOURER AND HIS FRIENDS.

THE *Times* of Wednesday has an admirable leading article on the agricultural labourer. It sums up his whole case with great judiciousness and skill. It regards him, from every point of view, as a part in the great industrial machine; as the horse or the steam-engine is; as a dealer offering his labour, for what he can make for it, in the market, it may be conceded him that he is "a free fighter in the battle of life entitled to try any methods and organizations that may promote his interests." He may be considered as the potter's clay, out of which he can be moulded into almost any form or thing by skilful hands—into a member of a Commune or of a Christian church. He may be regarded as a man to be raised or to be kept well down. All these conflicting notions about him have been ventilated with more or less enthusiasm and vehemence within recent months, but in nearly all the discussions, as the *Times* truly and wisely points out, the fact has been overlooked that labourers are moral agents, "each with a character distinctly his own, each no more open to improving influences than the classes over his head, but necessarily somewhat more stupid and obstinate than men of more varied experience and cultivated minds." Nothing could be better put, with regard to the case of the agricultural labourer, than the following:—"Let anybody bethink himself how difficult he would find it to change his habits and ways, even with all the world before him, and the past and future always in his thoughts. How is it likely a man should easily improve or easily adapt himself to any new state of things, when his life has been an invariable routine, in the same fields, and under the same circumstances? It is unavoidable, but yet a condition which must be borne in mind in all this talk about the labourer, that the material and physical part of his condition predominates almost to the exclusion of the moral. Of course it is pleasant enough

to talk as if purses were bottomless, land without limit, cottages, cows, pigs, and poultry, and fruit-trees as producible as the contents of a Dutch toy box. Whatever we wish for ourselves, it is proper to wish, on a suitable scale, for all whom we care for, or for whom we can even imagine a friendly interest. But what we have to do is to deal with the facts of the case, and in this case the greatest fact of all is the character of the class and of the persons whom we are concerned about."

That the labourer should have better wages and more comfortable cottages, most people are willing to admit, but wages do depend, however it may be argued to the contrary, not upon strikes, but upon the demand for the labour. The case of the agricultural labourer has not been thoroughly understood by many who have advocated his claims to higher remuneration. The injudicious way in which these amiable and well meaning men, (?) who throw themselves heart and soul into the cause of philanthropy, or of oppression, who are demagogues or monarchists, as the movement suits their pockets, has not been advantageous to the agricultural labourer. They have exaggerated his distress through their want of knowledge of his condition—they have made capital out of his poverty, and made discontent in his home. It is no secret that the language of vituperation is much more voluminous and effective than the vocabulary of praise. We cannot say with reference to those who have advocated the cause of labour in rural districts, that they have "no case," and therefore the proper course to pursue is to abuse the defendants: they had a case, but they have misconducted it. There has been, in most of the speeches made by those self-elected proclaimers of agricultural wrongs, *suppressio veri* amounting to *suggestio falsi*. It is no secret that many of the labourers who were enticed away into towns by the offer of what, in

figures, appeared to be more wages, have found that their comforts were less there, and have returned to the land from whence they came.

There are three ways in which the *Times* is of opinion that a new order of things may be brought about—such paradisiacal resorts for the labourers, as their speaking friends paint, created. There are, says our contemporary, three possible authors; and here we cannot do better than quote the precise words:—

The labourer himself; the landowner; combination in the form of the Commune, or some voluntary union. As things are, the position is attained by a comparatively few labourers by their own long toil, self-denial, and forethought. They make their own state, be it more or less after the above model. When the ideal is approached, the man who makes also preserves; and the possession itself becomes a guarantee for the qualities necessary for good management. The proper management of a family is easy to nobody. The proper management of a farm is easy to nobody. The care of cows, pigs, poultry, growing vegetables, fruit trees, good or bad soil, is easy to nobody. Ordinary labourers' work is easy to nobody; still less extraordinary. It is by no means everybody who can do any one of these things; while of those who can it is only a proportion that will give themselves the trouble to attend to business and be prompt to meet emergencies. A man may have very good and useful qualities, and yet be an indifferent master of a household, and a bad farmer. Nature may have designed him for a buyer and seller, or a servant, or, in short, for anything else than the care of an agricultural homestead. Upon the whole, we must say with regard to such a domestic establishment as is supposed in these ideals, small as it may seem, few men have the necessary qualifications; and in the absence of those qualifications, things will go to the bad. The buildings will go to decay; the sanitary arrangements will be neglected, and thereby be made nuisances; dirt, weeds, slough, rot, and vermin will prevail; the live stock will fall into bad condition, perhaps die; the children, tempted to stay at home, will learn nothing but what is bad, and the man himself will fall between two stools, his master's work and his own. . . . Further, what is there to be for the disasters as sure to befall us as commerce and everything else? . . . the more necessary it is to . . . that there will be no . . . What, then, is to be done in case of fires, . . . rains, diseases, accidents, blights, droughts, long . . . losses by robbers, and a thousand other . . . calamities?

At present we are not prepared with any other . . . propositions float-

ing in the very air round us than that we see little encouragement to attempt any violent change in the state and relations of the Agricultural Labourer. His is a case not for revolution, but for friendly and careful superintendence and assistance. Whether a few of the ideal homesteads in the villages adapted to the experiment would answer as prizes and promotions after a proper ordeal of work and service is a matter that landlords can judge best for themselves. Where the landlord is resident, he generally has the best men under his eye, and their prospects of employment in his service for themselves and their children are generally more than equivalent to any precarious profits from petty farming. It may be otherwise where the landlord is not resident. But, in the absence of any positive and ascertained qualification for the management of such a homestead, it is almost certain to be mismanaged, to the injury of the tenant, and still more of others about him. We are told, of course, that landlords will not do the work; and that it must, therefore, be done for them. It is to be done by companies or wealthy philanthropists. Be it so. Nothing is easier. There are, happily, in these days, persons blessed with money, benevolent motives, and exalted notions. There are plenty of landed estates in the market, in every part of England, from 50 acres to 5000 acres. £100,000 will suffice to purchase a very pretty estate, divided into two hundred little farms of the required dimensions. It would not be impossible to exercise a certain degree of selection among the very numerous applicants whom the projector would certainly find himself face to face with. There would be no model community, on which the world might look with curious and even longing eyes. We, indeed, recommend the munificent author to keep another £100,000 ready for casualties, for in case of need he might find some difficulty in mortgaging the property. But, in plain English, and in the name of common sense, what would it all come to? Ruin, confusion, misery, hopeless embarrassment, the triumph of the rogues, the spoliation of the simple, and before long, as we believe, nothing but ruined cottages, sheds, fences, gates, and roads to mark where once for a short year smiled Utopia.

With the latter part of the quotation we entirely agree. Comfort in small farms in the present age is a chimera of well meaning, but unpractical theorists. There are still some of these plots left in the United Kingdom, and in the interest of landlord and occupier, as well as in that of the consuming public, the sooner they are agglomerated the better. The farmers on such apportionments are hard-wrought and wretched-looking men, and cannot make the land yield as much as it ought to do, as they have not the means of tilling and manuring it properly.

ORD CARNARVON ON THE AGRICULTURAL LABOURER.

ORD CARNARVON presided at the annual dinner of the Highclere Agricultural Society on Wednesday, and in referring to the toast of his health, made some remarks on the late agitation among the agricultural labourers. He congratulated those not on the success of the harvest, and upon advantages which had resulted from the establishment of such associations, and concluded to say that they had not in that part of the country experienced any of the difficulties which some districts had had to contend with at the hands of the employers. There had been difficulties between employer and the employed going round them, but they had been left unattended, and he indulged the hope that this indicated, to a certain extent, the good kindly feeling existing in the county between employers and employed. He was sure, never such a feeling did exist, those difficulties would be lessened in degree, but at the same time the question which these dissensions raised deserved to be considered fully, not only by those who were employers but also the employed. Events in their natural course and the legislation of the past years had had a tendency perhaps to force upon them the results which they had recently been witnessing, but they were only at the beginning of other considerable changes, and depended upon them in a great measure how these changes would take. Therefore it was essential that they should bring themselves clearly and dispassionately to consider the question, and the more they familiarised themselves with the requirements which it demanded it, the better it would be for themselves and for those with whom they were brought into contact, and better for the country; and more surely would the solution, upon which depended, in a great measure, the prosperity of the country, be brought about.

THE ENGLISH AGRICULTURAL LABOURER.

He would venture to say two things, which might sound very much like truisms, but which had been greatly lost sight of in this dispute. First of all, he would say that there were two sides of the question; and secondly, he would say that it was to the interest of all parties, but especially to the three parties concerned, viz., the farmers, the labourers, and the landlords, that a settlement of the difficulty should be arrived at amongst themselves. He did not like intruders to come in and make it up for them, because he believed a fair, honest, individual settlement could be arrived at without them. He would say a few words upon the three classes to which he had alluded; and first, as to the labourers, he would put aside all the idle declamation which had taken place with regard to the labouring class, and it seemed to him there was no class less understood in the country than the labourer. He was generally painted in the most extravagant character, and if the subject was not a serious one he would say it was almost ludicrous. Those present were familiar with the English labourers, and he thought the great majority would agree with him when he said that they were what they were represented by their professed admirers. He would ask, what really was the condition of the English labourer? He thought, if they would be fair, they would admit that his condition, looking back upon the past, was in some few respects less good, but in other respects was much better than it used to be. It was less good, he apprehended, in these points. The labourer had probably less ground for his own purposes than he formerly had; the commons, in a great measure, had been enclosed; and whilst there had been with every other class in the coun-

try a large rise in wages, there had not been a proportionate rise in the wages of the agricultural labourer; and lastly, he thought the Poor-law, so far from assisting the labourer, had in some respects tended to aggravate the difficulties of his position. But, on the other hand, the cottages generally were now better than they were; greater attention was paid to the garden; and the sanitary arrangements and articles of comfort were now within the reach of the labourer, which were entirely out of his reach before. The law of settlement again was far easier than it used to be, and there was this further advantage, that the services of the good workman were universally recognized and appreciated. Therefore it was that he (Lord Carnarvon) objected to outside agitators who knew nothing of the matter, interfering to attempt to accomplish an object which could be done better without them. But it would be said that they were objecting to what was the right of all men in England, namely, the power of combination. He did not think there was one person there who was so unreasonable as to object to combination, but as a famous character in the French Revolution said of Liberty, so it might be said of political combination, that many crimes and offences were perpetrated in its name. There were two sorts of combination—there was legitimate fair combination of a class for a legitimate object, to which no one could object; and there was combination which was fictitious and factious, and which proceeded from outside agitation, to which he strongly objected.

THE FARMER AND UNIONS.

A great deal had been said and written with regard to the English farmer during the last six months, which was calculated to move both open contempt and indignation. People were told that the nature of the soil differed in different parts of the country, and that the annual produce was much less than in other countries, which had made his country so prosperous. Many forgot how largely the element of weather affected his produce, and the results of it, and there-

fore they talked what appeared to him to be nonsense when they attempted to apply all those principles which were common and necessary to the merchant to the trade of the farmer. Still more was this the case when they considered the highly complicated nature of modern agriculture, by which everything, so to speak, turned upon the proper use of machinery at the proper time, and when the whole profits of a year or half a year might be imperilled by bringing the work of the farm to a standstill. Let them picture to themselves a trades union standing by and interfering in order to throw the whole work of the farm out of gear, and then they would see the impossibility of entering into comparisons with manufacturing businesses. Therefore he considered trades unions were a bitter enemy to the farmer, and that they would strike a fatal and deadly blow against English agriculture.

THE LANDLORD AND THE LABOURER.

Now, a word to the landlords. They were, he knew, in the habit of coming in for a good deal of abuse, sometimes perhaps with justice, and sometimes with a good deal of unfairness. They were blamed very often for the state of cottages, although those cottages frequently belonged, not to the landlords, but to speculators, who built them for the purpose of making a profit by them. They were sometimes favoured with what he called fabulous remedies. They were told that 700,000 cottages, which were to cost £70,000,000, were required, but where the money was to come from, and what was to be the return for it, he did not know. He considered the Legislature had given the landlords extremely little help, and notwithstanding this, he believed there was an earnest wish on the part of the landlords to do all they could in the way of improving the dwellings. He did not believe that the cottages paid any return, or if they did, it did not exceed $1\frac{1}{2}$ per cent. They were let, as a rule, to the tenants out of a kindly feeling, and with the earnest desire to improve the social and material condition of those who resided upon the property. But if the

trades unions had their way, and those political theorists who declared that mere money-payment was the only point which existed between employer and employed, then it would be clear to every one that the rent of the cottages must inevitably be raised. The labourer would find out that his most professed friends were, in reality, his hidden enemies.

THE LABOURER IN CONNEXION WITH
LANDLORD AND TENANT.

He believed there was an earnest desire on the part of the farmers, and all concerned, to meet this question in a fair spirit, and during the winter he advised them to give their serious consideration to it. This question, be it remembered, was only a part of the greater one which was coming upon them, and it was one which could not be satisfactorily settled by mere cash payments. There was the question of privileges, which he disliked very much. It was not so simple a matter as it looked to outsiders, and it was one which the labourers, as a rule, preferred to a mere cash payment. He believed the more the labourer understood the question, the clearer would he see there were two sides to the question. He was satisfied that there would be greater facilities for the migration of the labourer from place to place; but, at the same time, there would be a larger introduction of machinery into agricultural pursuits, and with that there would always occur a diminution in the number of hands necessary to work a farm. These were changes which the events of the future would inevitably bring with them, and they could not be resisted or avoided. If the labourers desired to go to the north of England they would do so, and would probably be able to earn higher wages, because, in the manufacturing districts the profits might, in some cases, be reckoned at 50 per cent., while in the south of England, the farmer was

content with his 5, 6, 7, or 10 per cent. And then arose the question, was it policy to the farmer to hold out inducements to the labourer which would prevent his leaving? The landlord could help in the matter of cottages and gardens; he might see that they were adapted and sufficient for the population; he might also see that there was a due appropriation of allotment ground for those who desired it, and that a sufficient number of small holdings existed to admit of the thrifty improving their position. The establishment of friendly societies was another point which should be closely watched; and further, he advocated the system of piece work wherever it could be applied, believing it to be sound in principle. Lastly, there was the principle which had found little favour as yet, but which he believed to be not only in the abstract sound, but which, under certain limitations, might be successfully applied. He alluded to the proposition of the Speaker of the House of Commons to pay the men a certain interest upon the profits of the farm. He considered this was a principle which deserved consideration, because it was sound in itself. They were now in a state of transition, and they must prepare for changes; but there were sure and certain ways of meeting those changes without inconvenience to existing interests. There was the motto of an old London company which he remembered, to the effect that by harmony small fortunes were built up, and that by discord the greatest fortunes were ruined. What greater fortunes would there be than the fortunes which had been built up through generations and generations of those who had gone before them; and he would say of English agriculture, might it long thrive and prosper; and it would prosper in the future as it had prospered in the past, only by the harmony and concord of those who were mostly concerned in it.

LORD NAPIER ON THE LAND LAWS.

THE annual meeting of the Social Science Association was inaugurated at Plymouth on Wednesday, when Lord Napier and Ettrick, president, delivered a long address on some of the most important questions of the day. Alluding to land tenure, he remarked :—

The distribution of property is the feature in our laws and customs which presents the greatest apparent hardship, which arouses the keenest sense of injustice, which affords the readiest materials for misrepresentation, and which discovers the most dangerous inconsistency between our political institutions and our social condition. With reference to real property, let it, then, never be forgotten for one moment that Great Britain stands apart and alone in the civilized world. In other respects our institutions, compared with those of foreign countries, exhibit that sort of divergence which may be likened to the various elements of colour in a diversified but not inharmonious pattern. In regard to property, there is a contrast which arrests and offends the eye. Permit me to present once more, in a few rapid strokes, the familiar features of the case. In Great Britain real property is transferred and transmitted under laws, customs, and influences which all combine with irresistible increasing power to produce consolidation. Primogeniture, entail, traditional predilections, the exigences of fashion and recreation, the accumulation of capital are working incessantly together to promote great aggregation of land in the hands of a few.

THE DISTRIBUTION OF PROPERTY IN GREAT BRITAIN.

In Great Britain real property have not been divided with the same accuracy, but the result is to produce the number of small holdings of a garden, or less, more than 100,000 in a country which numbers more than 26,000,000 inhabitants and there are but few counter

acting agencies at work to mitigate the perilous progression towards monopoly. It may be broadly asserted that in no country does so large a proportion of the population live in lodgings as in Great Britain, or in separate habitations as tenants at will; in no country do so many live on the land of others without a lease or with a terminable tenure; in no country are the prerogatives of property vested in such restricted number. The attitude of the English Government in matters of land tenure and land revenue has been influenced at different times by the political sentiment and economical theories preponderant at home. Our policy has now taken a permanent root, I hope. It is one marked equally by justice, prudence, and benevolence. The Government respects the guaranteed rights of the landlord, or zemindar, however inconvenient they may be in regard to the fiscal interests of the State; they decline, in reference to the occupiers under other tenures, to allow an irrevocable alienation of the undisputed right of the State to share in the increased value of the produce of the soil, not created by a capital of labour of the cultivator, but there is an unquestionable inclination to recognize and confirm a popular tenure in the land. It would be easy, but it would be idle, to multiply examples from the legislation or the usage of foreign or dependent nations to prove with what strength and unanimity the disposition runs to impart the benefits of real property to the greatest number. Unhappily, in searching for the means of action, it becomes at once apparent that there are many difficulties in the way which have not operated with the same force in other countries, in which the question has been already solved, or which are altogether peculiar to our condition. Among these impediments the following may be noted as the most conspicuous:—The extinction of all positive or traditional

claims to a participation in the land-rights of the proprietor on the part of the occupiers and cultivators, leaving nothing but rights under contract where such exist; the high value of land produced by the abundance of capital derived from the profits of manufactures and trade; the immense amount of capital invested by the landlord, in Great Britain, in farm buildings and permanent improvements in connexion with the existing groups or areas of cultivation; the large amount of capital required for the cultivation of land, and the maintenance of stock, in a country where scientific culture is firmly established, and where that country alone can raise production in any degree to a level with the requirements of the whole people, already so insufficiently supplied; the power which the proprietors of land, and those who share their interests and convictions, possess, and justly possess, in the legislature and government of the country. Bearing in mind these exceptional features in the social and political condition of our country, the President next proceeded to a consideration of the expedients which have been proposed, or might be suggested, for the correction of the evils and dangers attached to the excessive concentration of real property, with the view of ascertaining what can be adopted for present action, and what should be definitively or temporarily laid aside. The conclusion at which he arrived was that the necessary measures are to be found in the removal of laws which act as an impediment to the division and improvement of landed property, or as an instrument for its consolidation; in the institution of authorities and regulation by which the proprietor of land may be enabled and obliged to perform his duty by the land, and especially by the labouring poor settled upon it; in the encouragement of private and commercial enterprise, and in facilitating the acquisition of real property by the honest and industrious labourer and mechanic.

PRIMOGENITURE AND ENTAIL.

The abolition of the right of primogeniture, and the restriction of the powers of destination with reference to land, would increase

the number of estates placed in circulation, and disseminate the benefits of landed property, without any violent shock to existing interests and feelings. The mere size of estates in which primogeniture is chiefly operative, has no pernicious results. On the contrary, the greatest estates are often the best ordered. It is rather the law of entail which acts as a bar to social amelioration. In discussing this question, we must be careful to avoid extreme and indiscriminate assertions. The condition of life ownership has not always and everywhere prevented the development of cultivation, the improvement of farm buildings, or the re-construction of the habitations of the poor. If I were to conduct any gentleman whom I have the honour to address through the south of Scotland, that part of the kingdom to which I am least a stranger, he would find it difficult to discriminate, from the aspect of the fields, the state of the fences, or the quality of the buildings, between the land which is free and the land which is bound. He might be shewn estates under strict destinations, where every habitation has been rebuilt in a single generation by the intelligence, philanthropy, and taste of a life landlord; and he might be shewn lands purchased as an investment, in which improvements of this nature have been restricted to a bare commercial necessity. Or he might see an entailed estate which is a model of order, lying contiguous to one which is a picture of social desolation and neglect. There have been on entailed estates many causes at work which have tempered the mischief which naturally belongs to the practice of entail. The development of mineral industry has in many cases enriched the life proprietor, the State and the loan societies have come to his assistance. Influences of a moral nature have been powerful auxiliaries in the same direction. The life proprietor is still moved by duty, by self respect, by traditional affection, by emulation, to make great pecuniary sacrifices in advancing the moral and material condition of those by whom he is surrounded. To do this sort of good is even a selfish pleasure. The spectacle of

disorder and decay is revolting, and the habitations of the poor are the furniture of the estate. The terms on which money can be borrowed on entailed estates might be rendered more easy, and the purposes for which it can be borrowed might be enlarged; but I cannot regard proposals of this sort in any other light than as a feeble struggle for the prolongation of a system which is doomed to early and inevitable extinction.

THE LABOURER AND THE LAND LAWS.

The reports of the Commission appointed to inquire into the employment of children, young persons, and women in agriculture, are the true mirror of the condition of the labouring classes depending on the land. Nothing is disclosed in stronger colours in these reports than this, that the dwellings of the rural population urgently demand a very general reconstruction. It would be hazardous to assert in the face of those statements that more than two-thirds of the existing habitations are satisfactory, or susceptible of improvement and enlargement. The last census report for Scotland tells the same story, and supplies some statistical details. One-third of the population live in tenements comprising one room only; another third live in houses with two rooms; one-eighth only possess dwellings with three rooms. There is little distinction between the scale of lodgings for the industrial and for the agricultural classes. As far as the rooms are concerned, dwellers in towns are provided in the same way as dwellers in the country. A comparison of the reports concerning England with those concerning Scotland lead me to believe that, with reference to house room the two peoples are now much alike. If a minimum of one-third of the agricultural homes of Great Britain require to be rebuilt, we have something like a measure of our real necessity on the rural side. It is a matter of building 700,000 cottages, at a cost of 70 millions sterling. In regarding the work that lies before us, two things strike me as certain. The work cannot be done in any considerable measure by the labourers, and there must be a cessation of all direct remuneration to the agricultural reports are de-

cidedly adverse to the old-fashioned freehold cottage. Give the labourer a patch of soil for himself or let him take it; he will raise a hovel which will too often become a scene of overcrowding, dilapidation, slovenliness, and every sanitary abuse. Build the labourer a substantial and wholesome habitation, on a garden and fixture allotment, and let him become the proprietor of the place by a course of industry and self-denial, there is a prospect that it will be kept with decency and pride. In the reports recently submitted to Parliament, on the operation of building societies, I do not find to what extent they have spread to purely rural districts. I conceive, however, that it would be much in the interest of proprietors of land to encourage the introduction of these agencies by becoming shareholders, by recommending them to the labouring classes, and by providing them with freehold sites on beneficial terms, with careful provisions, however, as to the quality of the structures to be erected.

I regret that I have not been able to refer to the introduction of the co-operative principle in the cultivation of the soil, or to the acquisition of real property by the artisans and workers in factories resident in towns. The emancipation of the land from its present trammels is, however, a desirable preliminary to the former, and would prove a valuable aid to the latter. The Parliamentary report on building societies contains a vast mass of information, in a rather undigested shape, upon the effects of association in various forms in enabling the working classes to become possessors of new dwellings. The happy innovation which is thus being carried out in many districts is, perhaps, scarcely appreciated by the public. It appears to me that by these agencies, aided by improved legislation, the force of public opinion, the enlarged authority of municipal bodies, and the facilities of modern locomotion, the benefits of real property may at no distant date be made as open to the English operative as they are in any part of Europe, except, perhaps, among the artisans in Germany and Switzerland, who are engaged in cottage industries, or in rural factories, provided with water power.

SIR JOHN BOWRING ON THE AGRICULTURAL LABOURER.

IN the Economy and Trade Section of the Social Science Congress on Tuesday, Sir J. Bowring delivered the presidential oration. In the course of his remarks he referred to the condition and improvidence of the agricultural labourer. The late enormous increase in the prices of all the necessaries of life, he said, especially in food and fuel, cannot be passed over unnoticed. But masters and workmen are alike too generally ignorant of the peremptory and paramount laws of political economy; they will finally regulate all contracts; and the best advice to masters is, that they should cede to the reasonable demands of their servants; and to these latter, that they should carefully guard their savings in the day of prosperity, as the day of adversity will assuredly come. The condition of the agricultural labourer is in many respects most unenviable, and very difficult it is for him to raise himself from his low condition. He is little disposed, except under very severe pressure, to quit the soil where he was born, and which his father had cultivated before him, and the poorer he is the less able is he to migrate. He belongs to no organized societies to which he can look for relief in time of need; and the abuses no longer exist, or only on a small scale, which enabled the farmer to augment the labourer's pay by exacting, through the poor-rates, contributions from the public. Moreover, the farm labourers are, for the most part, very ignorant, and widely scattered; they have few or no intelligent representatives from among themselves; no press or papers of their own. But the better instructed workmen have not only their special clubs and unions connected with their particular trades, but they form part of an immense community, banded together by stringent rules, possessing considerable funds, having their recognized leaders, their newspapers, periodicals,

pamphlets, and, moreover, exercising, as they must, great and increasing political influence, they are in constant communion with the leaders of public opinion in the various sections of the State. Whether a movement, lately indicated by the Speaker of the House of Commons, to introduce the co-operative principle into the sphere of agricultural labour will find the labourer ripe for its adoption—and here, as everywhere, “ripeness is all”—is a question which time only can solve. There is a widely-spread feeling that something ought to be done, and a desire that effectual aid should be given. The agricultural power is of great weight in this country, and when it is discovered that there is to a vast extent a reciprocal interest which should bind landlord, tenant, and labourer in a common bond, the good work will proceed. Few matters are less understood among the labouring classes than the art of cookery; for cookery is in itself a science which is closely connected with the economy and with the comforts of every family; and, as elsewhere, waste is the result of incompetence. The English races are singularly backward in kitchen knowledge, which ought to form a part of the knowledge of every woman. Nor would it be amiss that men should know a little more about kitchen economy than our people. In visiting the camps of our soldiery in foreign countries, I was struck with the greater variety of small enjoyments which the French *militaire* provided for himself, especially in soups and salads, unknown to the English soldier. The French made little gardens in the neighbourhood of their tents; the English seldom or never. The savings-banks, now so much aided by their association with the Post Office, amount to more than 4000, and hold more than £17,000,000; and the facilities given to depositors is one of the marked improvements of the age, and an evidence that numbers of

the labouring class begin to understand the value of economy and the desirability of making some provision for what they call the "rainy day." It is to be hoped, as they better understand their true interests, they will, instead of benefit clubs, in which they are so often robbed and deluded, be more and more disposed to avail themselves of the simple official machinery now made so acceptable. Benefit societies held at public-houses frequently bring with them the evils of intoxication, waste of money, and destruction of family happiness. There can be no doubt that on the whole public morals are improving. The Secretary of State declared emphatically at the International Prison Congress that, whether from the progress of education, the increase of national prosperity, or the greater demand and better reward for labour, there has been a considerable diminution of crimes, notwithstanding a progressive increase in the population. It is true that statistics fail us on a very large portion

of the social field. Take the case of intemperance. We can follow some of the mischief it produces. It might be possible to form an approximative estimate of the number of those who frequent publichouses, and the proportion among them who indulge in drinking to excess; but who can penetrate into private homes, and state how much there is of social and how much of solitary inebriety? Who can pourtray the mischiefs and miseries which the abstraction of money for the purposes of drink has caused in the diminution of the supplies of the comforts and luxuries, to say nothing of the necessities of life; what innocent pleasures might not have been enjoyed; what instructive books might not have been read; what becoming garments, instead of disgraceful rags, might not have been worn; what wholesome food and drink instead of pestilent poison; what happy, well-ordered homes, instead of offensive hovels, broken furniture, foul beds, and all the attendants of wretchedness and woe!

AGRICULTURE AND AGRICULTURISTS.

BY MR G. A. DEAN.*

I WILL call your attention first of all to the present high prices of beef and mutton; and then to some other matters in which we are all more or less interested. Among "towns' folks" an impression prevails that the high prices of meat are caused by the restrictive Acts in force respecting the importation into this country of foreign cattle and sheep—that these Acts were passed to protect the interests of home breeders—and that if the waste lands of the kingdom were brought into cultivation, and appropriated to the breeding of cattle and sheep, there would be no necessity for foreign importations. Now you all know that the present high price of meat is caused by the

scarcity of it—also that supply and demand always regulate price—and that neither the present high price, nor any price which the general public would pay for beef and mutton would recoup stock-breeders and feeders for the excessively heavy losses which they have sustained from diseases in their stock, and those they are sustaining at this time. It is reported that in 1865 and 1866, 278,439 head of cattle were attacked by disease in England, Scotland, and Wales, thus showing how important it is to prevent diseased foreign animals from being allowed to roam at large in this country. Contagious diseases imported into this country by foreign animals are no doubt generated by the use of bad and improper food while driving them to shipping ports, augmented by the chills they sustain while being thus

* Delivered before the Great Eccleston Agricultural Society.

driven, and increased by confinement on board ships, where the animals breathe a vitiated atmosphere which poisons their blood ; while their exhalations poison the air it is discharged into, also the blood of other animals breathing it. Therefore, in my humble opinion, all imported cattle should be slaughtered on arrival at our ports. Better regulations should be made in cattle ships, so as to prevent overcrowding of the animals, who should be well supplied with water and hay, and carefully tended on their passage, when they would be landed in a far better condition than they now are. During the last fifteen years I have exported thorough-bred and cart stallions, bulls, cows, and sheep, either to Australia, New Zealand, or the Cape. The animals exported were always housed on deck, and generally arrived at their destination in good condition. One bull which I purchased in the neighbourhood of Preston for £40, was exhibited at Adelaide ten days after arriving there—took the first prize, and was sold for 240 guineas—thus proving that condition can be retained during even a long voyage.

THE CULTIVATION OF WASTE LAND : CHAMBERS OF AGRICULTURE.

The idea that the waste lands of the kingdom would, if brought into cultivation, obviate the necessity for importing foreign cattle and sheep is simply absurd. Much benefit, however, would arise were such lands brought into cultivation, and I am an advocate, and always have been, for bringing them into cultivation, but, judging from the actions of our Government, it would seem that they are not. For the last three years Government has stayed all inclosure proceedings, and this year brought in a bill which, fortunately, has not become law, providing that in future at least one-tenth of all lands to be inclosed should be set apart, and either given to the public or appropriated to public use. Now very much of the most accessible and naturally productive waste lands of the kingdom have already been inclosed ; the cost to reclaim and cultivate those remaining waste would be so great

that, if one-tenth be given to strangers, I very much question whether they would repay the expense of inclosing and cultivation. If Government would assist our colonists, and throw a greater amount of parental care over our colonies than they do, the millions of acres of waste lands which stretch themselves out both far and wide, soliciting man, as it were, to develop their latent fertility, would rapidly become cultivated lands, and supply us with enormous quantities of animals and grain. The next question to which I will allude is the importance of the agricultural community aiding by every means in their power their representatives in Parliament to obtain a more equitable adjustment of taxation of land and house property. You will, doubtless, remember that during the recent parliamentary session Sir Massey Lopes obtained a majority of hundred members of the House of Commons, who by their votes, agreed with him that a re-adjustment of the taxation of land and house property ought to be made, and Mr Gladstone has promised to consider the question in the next session of Parliament. Let us hope he will act in good faith, although I have but small faith in his acting with landed interests, recollecting how he has acted with the land of Ireland. It is necessary, therefore, that we should strengthen the hands of Sir Massey Lopes and those members of Parliament who are acting in concert with him, and I will tell you how I consider this may be done. It is well known that the establishing of Chambers of Commerce have largely benefited manufacturers and others engaged in commercial pursuits, and that within the last few years about sixty associated Chambers of Agriculture have been established in various parts of the kingdom. This year one has been established in the southern portion of this large county, and the Earl of Derby is president of it. These associated chambers act together in this way. There is a Central Chamber in London, and when any important subject is to be discussed, deputations from other Chambers meet the London Chamber, and discuss the questions for consideration. I recommend

you to form a Chamber for the Fylde district, and should you decide upon forming one, I shall be happy to join the Council, and act as your representative at the Central Chamber, or in any other way that I can be of use to you.

THE POTATO DISEASE : AGRICULTURAL STRIKES.

I will now allude to the potato disease, which, I regret to see, has re-appeared, not only in this large potato-growing district, but more or less throughout England, Ireland, and Scotland. Some theorists attribute the disease to electricity in the air during thunderstorms, others to other causes. Some as a preventive recommend growing broad or other beans between the rows of potatoes, others other remedies; but none, so far as I can judge, have been proved to be preventives; it must be remembered that science is restricted to a single aim—that of finding a theory for nature—it cannot find out causes. Nature permits not man to extort all her secrets, nor to lose his curiosity by finding out all her perfection. I last year gave my views of this disease to the Rawcliffe tenantry. The cause I do not pretend to account for; but as a preventive I advise greater care in the selection of seed, in the mode of culture, and in not growing this root too frequently in the same soil, but in rotation with other crops. Land will become potato sick as well as clover sick, as it will of any other crop if grown too frequently. Several years since I stated in this room that one day the occupiers of the moss lands in the Fylde district would have cause to regret growing potatoes year after year, and often without change of seed. We all know that animals degenerate when bred in and in and so do seeds grown continuously in the same soil. I think it would be better to grow potatoes from seedlings, to be sown in rows wide apart, at least twelve inches from plant to plant, so that sun and air may reach the soil. Also select varieties which do not grow luxuriantly, and to grow potatoes in rotation with other crops when I believe

the virulence of the potato disease may be avoided, but I do not think it will be effectually guarded against by adopting any known remedy in certain seasons. Another disease has been very troublesome to agriculturists this year—I allude to the strike disease, which is evidently contagious. The animals originally inflicted with it were political spouters, and these imparted the disease first among artisans, and then among labourers, both of the town and country. I, however, have not heard that the disease has appeared in this district, probably because your labourers are as highly paid as any in the kingdom. I regret that the farm labourers of any district should become tools in the hands of designing agitators. I am, and always have been, an advocate for paying fair wages for a fair day's work, and detest oppression of every kind. If, therefore, farm labourers in any particular district have a grievance which requires to be redressed, they have an undoubted right to combine for the purpose of obtaining redress; this, however, they will not obtain by associating themselves with trades' unionists. They should remember, or be told, that the farmers of this country of open ports, have to contend against the closed ports of the world—that manufacturers and others can, and do, meet increased wages by increasing the selling price of the articles they make or produce, whether these consist of clothing, carpets, coal, iron, beer, houses, &c.; but the agriculturists cannot increase the price of their produce for the reasons just stated. They are, in addition, subjected to losses by diseases in their cattle, sheep, and crops, as well as from storms and floods, from all which losses manufacturers are free, or very nearly so. Farm labourers should think thrice ere they break up their homes, and sever those ties of friendship which have bound them and their employers for ages, but which ties have rarely existed between town labourers and their employers. Beyond all this, trades' and labourers' unions are only suited to the idle and ill-disposed, and operate as levelling systems of the worst descriptions. Farm labourers who join labourers' unions

should remember that, as unionists, they can never become farmers, as have thousands in various parts of the United Kingdom, and as have many in this district, some in this room.

LOCAL SOCIETIES AND SHOWS.

I will now conclude by reminding you of what I said four years since in this room, viz., that greater benefit is derived from district agricultural societies and shows than from larger ones, such as the Royal Agricultural Society and others of a similar description, as you are more interested in the agriculture of your own district than you can be in those remote from it. I retain that opinion more strongly than ever, and will venture to assert that there are scarcely any farmers present who have attended any of these large shows

more than once, if at all, but who regularly attend this, and do so because they are interested in it, and so with other farmers as to other district shows. Also because they have not many miles to travel to and from them. I, therefore, advise you to extend the usefulness of this association as much as possible. I recommend you in future to offer prizes for approved agricultural implements and machines—for machines and implements must supply the place, to as great an extent as possible, of scarce and high-priced labour. If our committee and secretary will arrange for prizes to be given next year to the exhibitors of such machines and implements, I shall be happy to provide a silver cup as one prize. For the great scarcity of labour, a more extended use of all kinds of machinery can alone remedy.

DISASTROUS HARVESTS.

THE *Aberdeen Free Press* has an article under the heading of "Disastrous Harvests," which goes back a century and a-half to find parallels to the present deplorable season in the north. It seems that from 1693 to 1700, "so cold and barren" were the seasons that for a good part of the time something like absolute famine prevailed over a considerable part of Scotland. The general character of the seasons in the above era is thus described by an old chronicler, writing of the south and west of Scotland:—"Our harvests not in the ordinary months; many shearing in November and December; yea, some in January and February; many contracting their deaths, and losing the use of their feet and hands, shearing and working in frost and snow; and after all, some of it standing still and rotting upon the ground, and much of it of little use either to man or beast, and which had no taste or colour of meal."

In the year 1782 again, the harvest in Scotland was late; and on the 5th October,

when "the oats and barley were generally green, a frost," we are told, "armed almost with the rigours of a Greenland climate, desolated in one night the hope of the husbandman." In short, a great proportion of the standing grain was so injured that it never properly filled or ripened, and pinching want, amounting in not a few cases to starvation, prevailed during the following season in these northern regions. The produce of the harvest of 1782 in Aberdeenshire was estimated at only 80,000 bolls, or less than one-third of the average crop.

This picture, dusky as it is, is unfortunately not unlike the one that will have to be stared in the face by Aberdonian arable farmers this year. It is pleasing to think that the pastures were exceptionally good this season, and the prices of fat stock uncommonly high, so that there will be some little set off by horn against corn. And yet the counter-balance will not be so heavy as it looks upon paper, for feeding cattle are so dear to the purchasers that the prices made

for them when they come to be sold in the southern markets leave less margin than many would suppose. The wholly cereal husbandman in the north of Scotland must experience very great loss indeed this year.

It is known that in ordinary fruitful and seasonable years, he suffers more or less from the ravages of hares and rabbits; often very considerably. This year the elements, as well as the *feræ naturæ*, have been against him. We do not now remember whether that watery Saint Swithin was unpropitious on the occasion of his celebration day this year or not to the Aberdonians, but he appears since that time to have taken revenge on the county for the sarcastic rhyme about him emanating from the Granite City many years ago. Along with the rhyme there were caricatures of his reverence floating down on waters which had swept over the standing corn, and carried away that which had been stooked after the reaper. It is difficult to believe that a saint should be revengeful, but the truth is, according to all our correspondents, that Aberdeenshire is in a very sorry plight indeed with regard to the harvest; and not only that county but others

in the north. The cereals were late in ripening, they are not all thoroughly ripened yet, and when the golden tinge had decorated beautifully the ears of the earliest kinds, frost and snow came, rain fell and put an end to reaping.

'For more than three weeks heavy rains have fallen, but a perfect deluge, we are told, descended on Wednesday, flooding the country and spoiling its produce for miles beyond the banks of the overflowing rivers. The harvest, which as yet in Aberdeenshire has made little progress towards completion, will, it is stated, "be irretrievably ruined." In nearly all parts of Scotland great loss, so far as all our reports go, must be sustained by the tenants, and losses, which many of them who are paying high rents and who have had this season to provide for enhanced wages to the agricultural labourer are very ill able to afford. We trust landlords who have not had, as yet, anything taken out of their pockets by the labourers' demands, will consider the hard case of their industrious tenants this year, brought about by no delinquency on their part, and act generously towards them by bearing part of their pecuniary burdens.

THE PROPER WAY TO DO IT.

WE extract the following from Sir Baldwyn Leighton's interesting pamphlet on "The Farm Labourer:"—

When I first came here five years ago, I found wages at eleven shillings a-week, and the men doing about two-thirds of a day's work for it, and though cottage rents were certainly low, the gardens were very inadequate. The first thing I did, was to pick out the best labourers I could find, and give them an extra shilling a-week, which afterwards sent up wages all round a shilling a-week; but, however, that's neither here nor there. One day my men (I employ eight on my farm) came to me, and said, quite respectfully, they

wanted me to consider if I could give them a rise in wages. Well, I said, we'll talk about it. How much do you want? 'Fifteen shillings a-week, and we think we can do more work on that than on twelve shillings.' Very well, suppose I rise you to fifteen shillings a-week, then you'll be able to pay me a full rent for your cottages, and you'll be able to pay for your own beer and potato ground; and subscribe to clubs, so that when you are sick you'll require no help from me. And then I shall be able to do with one or two men less, so that the worst will be knocked off. 'If you please, sir,' they said, 'we should like to talk this over amongst ourselves first.'

Next Monday morning then we'll have another talk. Next Monday morning they came with a different story. 'If you please, sir, we've thought better about the rise in wages, but could you let us each have a bit of ground, for our gardens are very small, so that we cannot keep a pig, nor grow vegetables for our families.' That I will, I said, and a good deal more I've got to say to you now. I've been thinking of our last conversation, and this is what I propose to do.

"1. To give you all a piece of ground, besides your present gardens, of a quarter to one-third of an acre, as conveniently as I can make it, for which you shall pay the same rent as I do. I've settled it with my landlord, who is quite agreeable.

"2. To give you as much task work as possible, so that you'll be able to earn two shillings or three shillings a-week more. Turning manure and many other things we've hitherto done by day work, we'll do by piece-work.

"3. To give you all an interest in my profits. You know the shepherd already gets so much on each lamb: now I mean you all to be able to earn something in your separate departments in this way. I divide you into two gangs, the men that attend chiefly to the stock, cowmen, shepherds, pigmen; and the men that attend mostly to the crops, ploughmen, waggoners, &c. For every lamb that is reared after the first fifty I shall allow sixpence; for every lamb after the first 150 I shall allow one shilling. I expect about 200 lambs this year, so that the shepherd may get about one hundred sixpences and fifty shillings, that is £5, if he raises 200 lambs. Then for every calf born I shall allow the cowman 2s. 6d.; for every litter of pigs reared, three-pence a pig, and for every pig fattened something more. Then for the fat stock, for every beast sold, I shall allow the man who looks after them one shilling in the pound on the profit. If I buy ten beasts for £200, and sell them for £300, that will be exactly one hundred shillings, or £5, for the man who looks after them. Then, as to the crops, that is white crops (I don't reckon the others) my

land on an average produces 25 bushels to the acre. Now for every extra bushel which by good cultivation, deep ploughing, or extra carefulness and labour it may be made to give, I shall divide one shilling per bushel among the crop men. Thus, if on my 100 acres of wheat next year, I get 28 bushels instead of 25, that will be three hundred shillings, or £15 to divide among those four men; and as I believe with better cultivation and care it may be made to produce nearly 30 bushels to the acre, there would be five hundred shillings, or £25 to divide among the four men, or £6 5s. each.

"4. But besides these profits, which I do not consider will come out of my pocket, but out of your increased labour and work, I propose to allow to one or two of you who have saved money (say £20) the run of a cow on my farm at 2s. 6d. a-week, as they do in Northumberland. (This was unanimously received with very strong expressions of approval.)

"That is my scheme: I have since made one alteration in giving to the pigman every year the least fat of all my bacon pigs instead of allowing him to keep one for himself; the consequence of which is that they are all so fat, it is impossible to select the leanest. The system has been going on now for three years come next autumn, with the most satisfactory results. I have only lost one calf in that time, whereas I used formerly to think myself lucky if I only lost two a-year; lambs and pigs in the same proportion. My land, that before never produced more than 28 bushels to the acre, and generally 25 or 26, last year gave 31, and will, I believe, average that for the future. I believe I am making money twice as fast as any farmer in Westshire; and I never knew before that it was possible for farming to make such profits. My men are perfectly satisfied, and do double the work they did before, getting in addition more than half their former income. I reckon that without raising wages above what I raised them when I first came, namely, from eleven to twelve shillings a-week (and leaving privileges and cottage rents as they were) my or-

may also have it examined by the analyst, who is to give him a certificate of the result, on payment of a small fee, and the analysts are to make reports quarterly to the authorities by whom they are appointed.

The other measure is more extensive in its scope, and bears the title of the Public Health Act. Its object, as its title indicates, is the better to preserve the public health, and especial mention may be made of better sanitary arrangements as to drainage and water supply. It will have to appoint and pay medical officers, inspectors, clerks and treasurers, and undertake the enforcement of various sanitary Acts, such as those relating to sewage, common lodging-houses, and the prevention of diseases. Provision is specially made for new drainage works, and for the formation of special drainage districts, with proper managing authorities and taxing powers. We hope Mr Medical Officer and Mr Sanitary Inspector will take a turn round some of our truly "rural" spots and places. They can scarcely cross the village green without finding the duck-pond to be a festering, slimy, stinking pool, connected with a trickling stream of filth, round which the children daily play. They might also dis-

cover fetid, fever-breeding cesspools under the very noses of the cottagers; while, were they to explore the interior of the picturesque old thatched dwellings, not excluding the bedrooms (often plural only by courtesy) they might find much that would not bear inspection—sanitary or moral. The Boards of Guardians are the Sanitary Authorities in such delightful localities. Where it is no one's duty to enlighten the inhabitants on these points, a blissful state of ignorance prevails as to the *mens sana in corpore sano*. The Act gives power to appoint *ex-officio* guardians, and parochial committees of persons who are not guardians of the poor; but we are afraid the spirit of Gray's maxim will generally prevail; where there is no great desire for getting rid of nuisances, it will be thought with him that—

"Where ignorance is bliss
'Tis folly to be wise,"

and the parochial committees will never be appointed. Boards of Guardians have quite enough on their hands in the administration of the Poor Law, without adding to it that of the public health; but the machinery is provided for sanitary regulations, and we rejoice in this as a step in the right direction.

THE TRANSFER OF LAND.

By SIR ROBERT TORRENS, M.P.*

THE question of applying to estates and interests in land the principles of conveyancing by registration of title has frequently been discussed by this Association. I have undertaken to bring it again under review, with the additional light thrown upon the subject through the labours of the Royal Commission on the Land Transfer Act of 1862 (Lord Westbury's), and more recently by the Parliamentary returns exhibiting the working of the corresponding act in Ireland (Record of Titles Act, Ireland, 28 and 29 Vict.), and by the blue book containing the reports of governors of the Australian

colonies, testifying the complete success of the same principle there, applied under a different method. As the question may be new to some of my hearers, I will commence by endeavouring, in as few words as possible, to explain the radical distinction between "conveyancing by deed" and "conveyancing by registration of title." Title by deed, we are informed, by probably as high an authority upon the subject as any in England (Mr Freshfield) can never be demonstrated as an ascertained fact; it can only be presented as an inference more or less probable, deducible from the documentary and other evidence accessible at the time being. This condition involves, in the first place, the

* Read before the Social Science Association.

by the expediting of the production of cotton fabrics through the instrumentality of machines, neither will it be the solicitors who will profit by their functions, as such, being superseded in the ordinary dealings with land by way of transfer, mortgage, &c. It would, however, be both unreasonable and unjust to ascribe the failure of this measure to any corrupt or interested opposition on the part of the profession, so long as there remain radical defects such as in the judgment of this Royal Commission, and as admitted by Mr Spencer Follett, the head of the department, "render it impossible to give the system the success it ought to receive to render it of sufficient public advantage." The evidence, moreover, is sufficient to shew that some at least amongst the leading conveyancers were willing, nay, desirous to adopt the system, if only the measure under which it was applied were such as they could conscientiously advise their clients to come under. More than one-seventh of all the lands in Ireland have been passed through the alembic of the Estates Court, with only one case of error of sufficient importance to be worthy of notice; and in Australia no less than 18,233 distinct titles (a considerable proportion of them complicated or blistered) have been placed upon the record without practical injury or injustice to any one. Under the system there in force, the requisitions which the applicant for registration is required to satisfy are :—1st. That he is in undisputed possession. 2d. That in equity and justice he appears to be rightly entitled. 3d. That he produces such evidence as leads to the conclusion that no person is in a position to succeed in an action of ejectment against him. 4th. That the description of the parcels of land is clear and accurate. These being satisfied, advertisement and the service of notices calling upon all claimants to shew cause against the applicant's title within reasonable time, are found to be sufficient safeguards against risks arising out of technical defects, and (in accordance with an ancient practice under English law), in the event of non-claims within the prescribed period, indefeasible title is issued to the applicant. The requirement of accurate description of the land is next objected to on the score of expense, but a fair consideration of the evidence will show the complaint on this score to be greatly exaggerated. To say, blameless. Colonel Leach, R.E., of the Survey Department, states in reply to questions 316 and 318 :—"The expense of survey is from 1s. to 2s. per acre, according to the size and character of the property; but the cases in which we have to require a new survey are very

few. As a rule the title maps are sufficiently correct." And again, 390:—"I may say that our entire expenses, including the examination of documents, the perambulation of the property, and the preparation of maps, &c., have varied from about £3, the lowest, to £20, the highest." 441:—"Since the commencement of the work we have not found the slightest difficulty either as regards the maps or in ascertaining all necessary particulars respecting the boundaries of the properties registered." Fortunately this is so; for this objection, if well founded, would lie, not against the Westbury method, but against the applicability of registration of title under any method whatever; for as Colonel Leach says, query 373: "An indefeasible title would be of comparatively little value unless the lands to which the title applied were defined. Such a title would, in fact, apply to the individual, not to the land, and not a plot of land could be said to have or be dealt with as having an indefeasible title." Surely immunity against disputes and litigation between neighbours, thenceforth for all time, may amply compensate for this trifling delay and expense incurred once for all in the preliminary stage. But be this as it may, those who argue against the requirement of strict definition of boundaries, forget that the aim and object of registration of titles—the motives for incurring inconvenience and outlay which the first placing land on the record entails—is the security, facility, expedition, and economy in future transactions attained by cutting off the retrospective character of the titles. If parties dealing are still to be necessitated, or even permitted, to look behind the simple entry in the record, and to refer to old deeds or other evidences, whether for encumbrances, boundaries, or any other purposes, the end and object of registration of titles, its *raison d'être*, in short, will be lost. They will be thrown back into the power of the attorneys, bound hand and foot. The third alleged cause of failure is the admission of trusts to be disclosed on the register, which practically involves the recording officer, or the party dealing in the responsibility of interpreting deeds and looking after the appropriation of proceeds, conditions scarcely compatible with the simplicity and facility in dealing aimed at in the Bill brought forward by Lord Cairns, and practically secured under the measure in operation in Australia; which, though permitting declarations of trusts to be deposited for safe custody and reference, requires the trustees to be registered, with absolute powers of disposition

and sale, beneficiaries and cestui que trusts being protected by a system of caveats requiring notice of intention to deal, and by a "no survivorship" clause amongst trustees. This defect, though dwelt on by all the witnesses as weighty and valid, is but slightly adverted to in the report coming incidentally under their objection "C," registering partial interest. The legal committee, whose report I have before quoted, give their judgment upon the main question as follows:—"The point concerns the fundamental principle of registration of titles as distinguished from registration of deeds—namely, that the entry in the record alone shall constitute an official dealing, the instrument executed by the owners being, like the railway transfer or bill of sale of a ship, only the authority to the officers to make the entry which confers the title. The Torrens system has adopted this principle, and appears to carry it out fully and consistently. There is, we think, considerable room for doubt whether the corresponding provisions of the government bill are adequate and sufficiently clear." Out of eleven commissioners six express dissent from the report upon this point, and their views upon it are thus forcibly expressed by one of them (Mr H. Thring):—"In my opinion, a register of title should in no case be a register of the contents of deeds, but should be restricted to the names of owners of certain estates in land known to the law, or capable of being defined by statute; in other words, a register of titles should not be in any respect a record of evidences of title. The system of registers established by the act of 1862 is not in accordance with the above principles. That act requires a record of legal instruments affecting registered land to be entered on the register, and allows in certain cases the whole contents of such instruments to form part of the registered title. Such a system appears to me to differ little from an incomplete registry of assurances, and to possess all the disadvantages without the advantages of the numerous schemes formerly proposed for the registry of deeds. I therefore think the existing system of registry should be altogether discontinued." I would wish to call special attention to this, the opinion of an actual majority of the Commissioners, because there is great danger lest the acknowledged failure of Lord Westbury's Act of 1862, and of the corresponding Act of 1866, applied to Ireland, should be mistaken as involving the failure of the principle of registration of title, so long advocated by this Association. Whereas, in truth, that great principle has not been

the position as land recently granted out Crown in the Australian colonies. The amendments really necessary in order to render it of 1862 a true embodiment of the system, by varying by registration of title, so as to put the system fairly on its trial, may be comprised in a very few words, although one of them is a radical change. I will enumerate them in the order of their importance. First, by abolishing the attempted compromise between registration of title and registration of assurances, in Clause 63, which makes property in land pass upon execution of a deed or instrument, and substitute for it the corresponding provision of the Australian Act, which declares that estates and interests in land shall pass or be effected by entry in the register; and instruments when executed shall have effect only as to the officer to make such entry and to attract between the parties. Secondly, in order to facilitate the first placing of land upon the register, a relaxation of the stringency of the amendment of Section 5, so as to allow the registering officer to accept for registration "good titles," in the event of non-claim after a period of notices and due advertisement. Thirdly, repeal of Section 14, in order to substitute a simple and effectual method of recording

by one register book, with instruments evidencing title to each separate estate or interest, upon the model of the Shipping Act, and as in operation in Australia, for the method by three register books, with land certificates and special land certificates, as condemned by Colonel Leach and other witnesses, and admitted by Mr Spencer Follet to be unsuitable for the conduct of business on such scale as would render it of sufficient public advantage. Fourthly, the abandonment of Section 32, so far as to exclude uses and trusts from being disclosed on the register. The most reliable evidence of the beneficial working of any system is afforded by the extent to which the public avail themselves of it. Up to the date of report given in the Blue Book, from which I have last quoted, no reply had been received from Queensland, but my system had been in operation in South Australia twelve years, in New South Wales seven years, in Tasmania eight years, and in Victoria eight years. The statistics from these colonies shew the progress at first to have been exceedingly slow, but gradually to have increased year by year as the public gained confidence from its very great success, and became aware of its many advantages.

Agricultural Implements and Machines

THE PREVENTION OF FORMATION OF SCALE IN BOILERS.

BESIDES the substances which act chemically, like soda ash, chloride of barium, carbonate of ammonia, extract of oak bark, &c., to prevent the formation of scale in boilers, there have been from time to time, says the *Scientific American*, materials proposed which act either by commingling with the mineral particles, thus retaining them in suspension, or by rendering adhesion difficult. Professor Bolley, late professor of applied chemistry at the Polytechnic School at Zurich, Switzerland, has investigated this subject, and we find in his report much valuable information. Saw dust from mahogany, as well as from coniferous trees, has been used with success. The former acts also chemically, as well as mechanically, owing to the tannic acid it contains. This acid combines with the lime, forming tannate of lime, which deposits itself as a slimy body, without adhering to the walls of the boiler. The saw dust from pine and other similar woods possesses only a mechanical action. Both, however, are soon reduced to a slime, and are thus objectionable for the reason that they are easily thrown by priming between the valves and the packings of the piston, and interfere seriously with their operation.

[illegible]

Among others, starch and sugary substances have been applied. Potatoes have been in use for a long time for the purpose in question. The starch, of which they mainly consist, is soon converted into dextrin or starch gum, whereby the water becomes viscid. Molasses acts in the same manner, as observed by M. Guinon in Lyons (France), and confirmed by Guimet; and both these gentlemen state that for a boiler of 17½ feet length and 8½ feet diameter, 10 lb. of molasses was amply sufficient to completely prevent the formation of scale for two months. Formerly it was necessary to remove the scale every month from this boiler. Guimet uses 6 lb. of starch syrup every month in a boiler of 8-horse power, with the best success. Steam is kept up in the boiler in question for fourteen hours a-day. To the same series of substances belong also dye wood extracts, since they yield glucose when acted upon for some time by hot water. This substance produces the same effects as sugary liquids. Bran and succory root, both of which contain starch, belong to this class. Payen recommends to add to the water in a boiler producing 600 lb. of steam daily, per month, 9 lb. mashed potatoes, 3 lb. molasses, 1-5th lb. dye wood extract, or, instead of the last named, 3 lb. of bran. As the last named substances contain tannic acid, they are chemically; hence the small quantity recommended may be well supported. It is any substances, or such that they may continuously prevent the formation of mineral because their smallest particles fill the points of agglomeration for the crystals, and thus render their agglomeration and accumulation impossible. But there is a grave objection to the application

of all slimy substances. In boilers of somewhat complicated construction, they collect upon parts where the water boils least, adhering there readily to the boiler; and since the water attains through them a higher specific gravity and produces scum, they are readily thrown into the steam pipes and engine cylinders. In spacious and simple boilers, they may, however, render good service.

Fatty bodies and tar serve to diminish adhesion. Spermaceti oil alone, according to Bedford, gives good results. It has been recommended to cover the tubes and parts exposed to the fire with a mixture of 3 lb. graphite powder and 18 lb. molten tallow. Newton communicated a recipe for a mass, which is said to adhere still better. It con-

sists of 8 parts tallow or lard, which is first mixed with 8 parts fine graphite (plumbago), and then well kneaded with 1 part fine charcoal powder, while warm. When it is to be applied, the mass is rubbed together with oil or gas tar. In applying these proposed remedies, it is not to be overlooked that, although only small quantities of gas and tar are rendered volatile by the steam, they may at times become troublesome. Some deny their efficiency entirely, maintaining that scale is formed wherever surfaces are directly exposed to the fire; but others say that this scale is more easily detached. There is here a large and highly remunerative field for inventors, and we hope it will not long remain unexplored.

considerable. The juice of this plant contains much gum and mucilage, and but little sugar."

From these data we cannot help thinking that comfrey would be likely to form a good summer feed with cake, corn, and pease, and such like dry food, for stall-fed beasts.

But our experiments did not end here, for while operating upon this Caucasian visitor, it struck us that the purple variety of our common ditchside native *Symphytum officinale*, common comfrey, if not the same, at any rate, was a closely-allied species. We, therefore, procured some sets of these from the ditches, and planted them as we had the others, and to our delight we found the petals get more blue, and the plant to assume the size and foliage of the *S. aspernum*, and it too was relished by cattle the same as its congener, and, curiously enough, on reporting the result of these experiments to the members of the British Association, the Rev. J. L. Jenyns, in the course of the discussion upon the subject, remarked that the "*S. aspernum* and *S. officinale* were growing to-

gether near Bath, and that it was impossible to distinguish the one from the other." It is highly probable, then, that we have in our wild comfrey a plant which might become of great value if brought into cultivation, and more especially in a season like the one we have just experienced. The roots of the comfrey strike deep, and it would seem that, although its habitat is by the ditch side, it will bear field treatment remarkably well. The best way to grow comfrey is from slips or division, as it grows several crowns from a single root. These are best put in in autumn, but, failing this season, they may be planted as soon as their leaves begin to shew, in well-dug or deeply-ploughed land, in which they will soon grow away. When it is about 2 feet high it may be used as a soiling plant—a second, and even a third cutting being possible from the same patch in a single summer.

Digging in a little rotten manure between the plant in autumn or spring will increase the crop, which, our own trials shew, may be continued for several years.

HORN AND CORN.

AN Abstract of Statistics as to the acreage of land in Great Britain under wheat, barley, oats, potatoes, and hops; and the number of cattle, sheep and pigs in the country up to the 25th June has been issued.

The stock returns show what the majority of the people would scarcely have believed. The foot-and-mouth disease was working sad havoc in the country for several months before June; pleuro-pneumonia was by no means infrequent—meat went up enormously; consequent, it was said, upon the scarcity of cattle and of sheep. Throughout all the year it has been complained that we had no stock sufficient to graze our pastures; throughout the season all travellers interested in agriculture, with their eyes open,

could observe that the grumbling of the British grazier was not without cause. There were by far too few "deep-uddered kine" and oxen, cropping the knee-deep grass, on the banks of quietly gliding rivers, or in immemorial permanent pastures. The stock, we were told, could not be procured; and that this was the truth any one who cared to test it, by venturing into the principal markets of the country, could have seen for himself. In the report made by Mr Fonblanque in February of this year he deplored the decrease in the numbers of cattle and of sheep which had been going on for some years. Natural enough was the thought, looking at the appalling reports we have had about the epidemic from nearly all counties and districts in Great Britain, and

the exorbitant price of butcher's meat, that succeeding returns would shew a further diminution in the flesh supplies of the United Kingdom. Fortunately this is not the fact. Up to the end of June we had in the realm, leaving out Ireland—5,624,106 beasts, which are 286,345 more than we had in the country when the return of Mr Fonblanque, in blue-cover, was issued to the public on the date we have previously mentioned. The fecundity of our sheep is more remarkable, considering the high price of mutton. In Mr Fonblanque's *full* report for February we find the following remarks:—"Owing to repeated drought and the consequent shortness of green food, the number of sheep in Great Britain decreased in each of the years 1869, 1870, and 1871. The total number in 1871 was smaller than in 1870 by 1,278,000; smaller than in 1869 by 2,419,000; and smaller than in 1868 by 3,592,000, or nearly 12 per cent."

The June report, we are happy to say, shews that sheep-farmers are, even with the "rot," better off than they were last year. We have now got, according to the abstract of the returns from which we are quoting, 27,822,864 sheep as against 27,119,569 last year, an increase which, averaging the sheep at about £2 each—certainly a moderate estimate—means about one million and a-half sterling. We can scarcely reckon cattle at less than £15 per head on the average, and in so doing the increase in the numbers this year over last makes us wealthier in round numbers, by £4,300,000. Pigs, although they are so scarce in the London market, have also increased since the last statistics were officially furnished in the Blue-book. We have now 2,784,890 to contrast with 2,499,602 in the previous year.

The increased value in this case, therefore, supposing the augmentation all comprised of "stores" of six weeks, would be something like half a million. In all, therefore, our live stock increase is equivalent to over six millions.

This gain has been achieved partly through a smaller breadth of barley, oats and potatoes having been sown and planted, but we had a larger acreage of wheat. Potatoes, fortunately, seeing that the disease is so prevalent, were not planted in the same quantity as they were in 1871, or in 1870. Hops show an increase of acreage over last year, and it is fortunate that they are being picked in good condition. The following are the figures supplied from the statistical department of the Board of Trade:—

EXTENT OF LAND IN GREAT BRITAIN UNDER

| | Wheat. Acres. | Barley. Acres. | Oats. Acres. | Potatoes. Acres. | Hops. Acres. |
|------|-------------------------------|-------------------|-----------------|---------------------|-----------------|
| 1870 | 3,500,543 | 2,371,739 | 2,763,300 | 587,661 | 60,594 |
| 1871 | 3,571,894 | 2,385,783 | 2,715,707 | 627,691 | 60,030 |
| 1872 | 3,599,158 | 2,316,235 | 2,705,645 | 564,083 | 61,929 |
| | Increase (+) or Decrease (—). | | | | |
| 1872 | +27,264 | —69,548 | —10,062 | —63,608 | +1,899 |
| over | or | or | or | or | or |
| 1871 | 0.8 per ct | 2.9 per ct | 0.3 per ct | 10.1 per ct | 0.3 per ct |
| 1872 | +98,615 | —55,504 | —57,655 | —23,578 | +1,335 |
| over | or | or | or | or | or |
| 1870 | 2.8 per ct | 2.3 per ct | 2.1 per ct | 4.0 per ct | 0.2 per ct |

TOTAL NUMBER OF LIVE STOCK IN GREAT BRITAIN
UPON 25TH JUNE.

| | Cattle. No. | Sheep. No. | Pigs. No. |
|------|-------------------------------|---------------|----------------|
| 1870 | 5,403,317 | 28,397,589 | 2,171,138 |
| 1871 | 5,337,759 | 27,119,569 | 2,499,602 |
| 1872 | 5,624,106 | 27,822,864 | 2,784,890 |
| | Increase (+) or Decrease (—). | | |
| 1872 | +286,347 | +803,295 | +285,288 |
| over | or | or | or |
| 1871 | 5.3 per cent. | 2.9 per cent. | 11.4 per cent. |
| 1872 | +220,789 | —474,725 | +613,752 |
| over | or | or | or |
| 1870 | 4.1 per cent. | 1.7 per cent. | 28.3 per cent. |

BREED OF HORSES IN IRELAND.

THE following is an extract of a report to Government by Professor Ferguson on the modern breed of horses in Ireland compared with that of a former time:—

Although there has been much difference of opinion expressed respecting the alleged deterioration of the breed of horses in Ireland and the contrary, it would seem that the change has been deliberately brought about to adopt the modern thoroughbred to the requirements of modern racing, rather than from either negligence or natural degeneration. The degeneration, if such it can be called, under such circumstances, of the modern thoroughbred horses, consists in a diminution of weight-carrying power and speed, and an early maturity, which enables the animal to compete in a race at a younger age as a racehorse.

A great difficulty now experienced of procuring good horses in Ireland of the best stamp, and the high prices for which they are sold, must not, however, be received as evidence of the degeneration in the breed. The demand for such horses for exportation, even one or fully matured first class, but of not less than two years old up, has of late years so much increased that there is a deficiency of supply, and consequently a proportionate increase of their value. Nor must the scarcity of such horses at the great fairs and horse repositories be taken as a criterion of the amount of the deficiency of supply in proportion to that of demand—the facilities of travelling being of late years so great that dealers and other purchasers are enabled to purchase at the stables and paddocks of the owners without being obliged to enter for the competition of the public market. So great has the demand become for heavy weight-carrying hunters, that now dealers or their agents are indefatigable in their searches throughout the country for the required article; instead of, as formerly,

the sellers being obliged to seek for purchasers at the different fairs and horse marts.

The number of horses exported from Ireland is greater now than it has ever been. The excellence of Irish horses, particularly as hunters, has long become justly proverbial, not alone as clever performers which may be accounted for in "made" animals, by the nature of the fences over which they have been ridden, but also as possessing greater hardihood of constitution and endurance or lasting power. As Irish horses in England and elsewhere still maintain their high character, it may be argued that they cannot have degenerated, otherwise they would be no longer so eagerly sought after, for England is a country in which it is universally admitted the finest thoroughbred horses in the world, with perhaps an occasional and very rare exception in France, are at present bred, and in the greatest number. Such an argument is, however, untenable. The same cause which effected the deterioration in Ireland of the class of horse most generally appreciated and valued has also had a similar influence in England and everywhere else where the object of racing has become the increasing of its transactions and of its sphere of betting speculation, instead of for what it was first instituted under Royal auspices—the improvement of the breed of horses, and subsequently the maintenance of the country's superiority in that truly national feature. In former years the weight to be carried by each horse was regulated by the age alone, an allowance being made to mares and geldings. In some very exceptional cases there were penalties of additional weight on account of some previous victory, often to prevent one horse carrying away all the prizes at one meeting. There was also in some races, principally intended for half-bred horses, an additional weight to be carried by thorough-bred ones, so that the breeders of the former might be induced to

requirements. Speed is the great desideratum ; weight-carrying power is not required. As a general rule, power must be sacrificed to obtain an increase of speed, and such is the case in the present mode of breeding race-horses. There are certainly some well-marked exceptions, but they are so rare that their existence does not affect the argument. In former years there were Royal plates run in heats of 4 miles each. It is to be presumed those on the Curragh were of good Irish measure. The weights also were heavy. Not unfrequently there was one dead heat, and that four heats, 16 miles, had to be run before the race was won. A reference to turf statistics will show how numerous the entries were frequently for such races, and how desperate were the contests. How many of our modern racehorses would be capable of such feats—particularly the carrying of the weight ? for which they would be totally unfitted, from their inability to support it with impunity during such a trying contest.

WEST HIGHLAND CATTLE.

the only hope of coping successfully with the foreign producer. It may not, therefore, be unprofitable to glance at some of the sources whence our supplies of animal food are derived. For the last twenty or twenty-five years the breeding and rearing of cattle has, from various causes—chief among which are the abolition of the corn laws and the development of the railway system—become a prominent feature in Scotch farming; and perhaps the best proof of the success with which the department of agriculture has been cultivated, not only as regards the native breeds, but breeds more properly English is the immense traffic in fat cattle which has sprung up from Scotland to the English market. The breeds of feeding cattle chiefly reared in Scotland are the shorthorn, the polled, the West Highland, and crosses.

the pure Scotch breeds, that known as West Highland, though not now so venerated as it once was, nor so highly prized as some of the southern breeds, deserves special attention, not only on account of its being the original breed of the west and a part of the north of Scotland, but also on account of its importance in point of character, its quality, its food, and its value as a breed to cross with. It is

difficult to trace the origin of any distinct breed of cattle, because climate, soil, and mode of treatment, and other conditions have, through time, in impressing special characteristics; but there can be no doubt that the horned, shaggy, hardy, and comparatively small breed of cattle, now best known as the West Highland, has for ages been the breed peculiar to the mountainous districts of Scotland, although it is now very confined to the counties of Argyll, Inverness, Perth, and Dumbarton, if "confinement" is a word which can properly be applied to so extensive a territory and so varied a breed. A well-bred animal, of whatever species, is a pleasing object; but

there are perhaps few animals familiarly known to us so graceful in form, colour, and temperament as a thoroughly well-bred Highland heifer. In form it possesses all the characteristics so much and so justly prized in the shorthorn—the straight back, the level ribs, the broad chest, the breadth of the hind legs, the depth of rib, and, in short, the "freedom" and solidity of form, which simply weight, whether in man or horse; while the noble branching horns, the full, round, and fearless eye, the short, thick, well-bred muzzle, the shaggy coat of black, or red, or dun, or brindled, impart a picturesqueness which is further enhanced by that grace and animation of movement so distinctive of animals reared in perfect freedom. All the characteristics of the breed are freely found in the Highland oxen exhibited at Christmas shows; but there the most attractive appearance does not carry the

The more sentimental and less earthy, however much they may denote purity

of breed, are overlooked by matter-of-fact judges of fat stock, and the prize goes—very properly perhaps—to the fattest, but not to the finest beast.

The largest folds of Highland cattle are in the islands of Uist and Skye; but in all the islands of the west coast of Scotland this is the breed almost exclusively reared, and in no other part of the country are its leading characteristics so fully developed. The nature of the pasturage, the moist climate, and the comparatively mild winters consequent on vicinity to the sea, produce hair and horn such as the more inland pastures of Perthshire can never rival; but, on the other hand, the inland pastures are supposed to conduce more to the growth of bone than do the island and seaboard pastures, and consequently the cattle reared in the inland districts are generally much heavier. Perhaps one of the finest herds ever seen in Scotland was in the island of Harris, thirty or forty years ago, in the possession of Messrs Donald and Archibald Stewart, who, by judicious mixing of the best blood that could be got in the counties of Inverness, Argyll, and Perth in their day, cultivated the breed to notable perfection; and their three-year-old oxen of large size, with horns like buffaloes and hair like goats, used to attract great attention in the districts through which they were usually driven to Falkirk Tryst. This herd is now chiefly represented by that of Mr John Stewart, at Duntulm, in Skye, whose cattle always carry high honours at the national shows. Mr Macdonald, Balranald, in Uist, owns perhaps the largest fold of pure Highlanders in Scotland, there being above a hundred breeding cows with their followers. This fold is of long standing and of great note, both as to numbers and quality. They are not heavy cattle, but fresh blood from the best Perthshire herds has been of late introduced, which will no doubt improve the stock in weight. Capt. Macdonald, of Waternish, in Skye, and Dr M'Gillivray, in Barra, have large and well-managed herds of fine cattle. Lord Colonsay had, in Colonsay, a well-bred herd of long standing, which has lately been dispersed under a change of

management. Thirty or forty years ago this herd was wonderfully improved by a bull, bought at what was then thought a very high price (120 guineas), out of a Rannoch fold in Perthshire. In Mull, Jura, and especially in Islay, there are fine herds of Highland cattle, the rich pastures of the island last mentioned being very fattening. On the mainland of Argyll no Highland fold is more noted than that of Poltalloch, and for many years Mr Malcolm of Poltalloch's name has always been found among the first-prize takers at the great shows. This stock has been carefully and judiciously managed and improved by periodical importations of fresh blood from the best inland herds, chiefly from the Breadalbane stock. Indeed, throughout the higher grounds of Argyll the class of cattle which one sees on almost every farm is very superior, and there is no better place for getting good Highland heifers than the June fair at Dumbarton, which is the great market for Argyllshire Highlanders. The Earl of Seafield has in recent years established at Castle Grant a fold of Highlanders which is rapidly coming to fame. There were numerous remarkably fine herds in the districts of Callander, Balquhider, Breadalbane, Glenlyon, and Rannoch; and the names of Messrs M'Laren, Callander, Macdonald, Monachyle; John Stewart, Donald Stewart, and Charles Stewart, Glenlyon; M'Laren, Rannoch, &c., were familiar over the Highlands as famed breeders of stock. During the gradual dispersion of these celebrated herds there was selected from them with great care and judgment the nucleus of that famed herd owned by the late Marquis of Breadalbane, which, at the time of his death, was probably the finest in Scotland. His man, Lord Breadalbane took a personal interest in his Highland cattle, and both in their selection and management he had the assistance of his friend and neighbour, the late Mr Stewart Menzies, of Chesthill, than whom there was not perhaps in Scotland a better judge of Highland cattle. The Breadalbane stock was carefully drafted every year, and the annual October sales afforded, for many years, an excellent opportunity to

farmers and other breeders of improving their stocks by purchases of pure blood. When the Breadalbane herd was sold in 1863 the principal purchaser was the late Duke of Athole, who then founded or rather engrafted on an old stock—for there were at Blair Castle the remains of a traditional breed of white Highland cattle—a herd which has since well maintained at Blair Athole the fame acquired by the Taymouth fold. Many of the animals exhibited from this fold at the Highland Society's shows of late years had, with perfect purity of blood, all the characteristics of the shorthorn as to shape and size. A Highland three-year old ox of the Athole stock, exhibited by the Duchess Dowager of Athole at the Perth show in 1871, was regarded by eminent judges at the show as the perfect model of an ox in shape.

The management of Highland cattle varies considerably in different districts, and according to the size of the fold. In the larger and more reputed folds the cattle are at large summer and winter, the breeding cows only being placed in separate pens or sheds at calving time, which is usually from January to March or April. In winter the stock generally get meadow hay or straw, and in many cases a few turnips in the open field, in addition to what rough grass they pick up in woods and other sheltered places; and it is surprising how they maintain condition under such treatment during the most severe winters. For some time after calving, and until the young grass comes on in May, the calves are kept separate from their dams, and let in to them to suckle three times a-day; but when the cows are turned afield, the calves are turned out along with them, and remain at foot until they are weaned, which is usually done about the beginning of October. The experiment of allowing the cows to calve in the open field, and letting the calf follow the dam at will from birth, has been tried; but the result was that both cows and calves became very wild, and the cows very dangerous to approach. In general, Highland cattle are gentle and good tempered; but when left to roam at large in the woods or on the hills, where they seldom see the face

of man, or at least of a stranger, they become shy, and, like all wild animals, guard their young with jealous care ; and the means of offence and defence at the command of a Highland heifer are not to be lightly regarded by the most courageous. The age at which Highland cows calve is usually four years, because it is found that, unlike softer breeds, the heifers are not at maturity until they are three years old, and of course breeding at an earlier age stops their growth. The usual practice with Highland farmers is to draft off in October or November their old cows and surplus young stock, the latter generally at six-quarters old. Prices, of course, vary with demand and quality ; but from £8 to £12 is the ordinary range of prices for the better sort of this class of young cattle.

The crossing of Highland heifers with shorthorns is a subject which is often discussed, and generally viewed with great favour by good judges of both breeds of cattle, but the experiment does not seem to have been yet tried with such success as to have commanded much attention. There may be various reasons for this, but it occurs to us that a main cause is that the experiment has hitherto been chiefly, if not exclusively tried by southern breeders, crossing two-year-old heifers or aged cows with short-horn bulls, producing in either case a diminutive offspring. If three-year-old heifers were brought direct from the hills and crossed with a pure-bred shorthorn, and afterwards maintained on their usual "sober" fare, there is every reason to expect that the result would be satisfactory, and no cross is so likely to be useful in upland districts as this, combining, as it should do, the "growthy" qualities of the shorthorn with the hardiness of the Highlander.

Until about eighty or a hundred years ago, the mountains of the north of Scotland were pastured with "black cattle," as the West Highland breed is still frequently termed, when they were gradually displaced by flocks of sheep. Previous to that time the stock of a Highland farmer consisted of cattle, horses, goats, and a few sheep, the goats and sheep

being generally penned at night ; and the remains of those pens are now frequently seen in the form of grassy mounds or the foundations of ruined walls on the green sites of the old "shealings," or summer quarters of the Highland pastoral farmer of days now long gone by. The cattle, from their hardy character, lived on the higher mountains during summer and autumn, and during winter and spring subsisted as best they might on such rough herbage as they could find among the woods or on the meadows of the lower straths or valleys ; but a frequent result of this rude manner of farming was that a severe winter, or still worse a severe spring, cut off, by sheer starvation, a large proportion of the stock. The only consolation was, that at that time the stock did not represent much money, and the rent was not difficult to pay. It is not above a hundred years since a grazier in the district of Rannoch, in Perthshire, not reckoned at the time as by any means a wealthy man, lost from starvation, one severe spring, 120 head of cattle. Now, the system of management, if system the old mode of farming could be called, is entirely changed. In many parts of the Highlands sheep have entirely displaced cattle—only a few cows, sometimes only one, being kept on the farm for domestic purposes, and these few are frequently Ayrshires or crosses. But over the greater part of the mainland and islands of the counties of Argyll and Inverness, the north-west of Perthshire, and the highlands of Dumbarton and Stirling shires, West Highland cattle are bred and reared on the lower lands, generally with marked improvement and success, and in many instances to great perfection. And there is every reason to believe that, in the districts named, this breed of cattle is the most profitable to cultivate, because from its hardy character it will thrive, both in summer and winter, under circumstances in which the smoother-coated and softer breeds would perish. Highland cattle are easily fed, and the quality of the beef is admittedly superior, and consequently in great demand ; but the objection to them, as compared with

farm, a very strong soil, in round butts, drained, might be improved by a course of tillage for hay growing, if laid down suitable for harvest machinery. Mr Barker spends annually about £100 in bones, artificial manures, and general improvements, of which he finds something annually to do; has drained the clayey portions of his farm, which consists of 85 acres, eradicated many old fences, and planted new where required. These, with remainder of fences cleaned from annual weeds and in good order. Has made many other improvements in garden and homestead. Mr B. has given a nice finish to a 'well cultivated farm' by having a homestead kept in the most orderly manner, well painted, whitewashed, and cleanliness in every place. The dairy department has every attention by the evidence of a first-class dairy of cheese. The whole farm is under very superior management, and deserving the prize.—Inspected August 22, 1872."

COTTAGES AND GARDENS.

Premium 8. To Thomas Buckley, Moreton-cum-Alcumlow, being an agricultural labourer, for having his cottage and garden in the neatest and best order.

"This is one of a pair of what may be termed Model Cottages, the property of Randle Wilbraham, Esq. It is very commodious and lofty, having a large house place, parlour or sleeping-room, two bedrooms, scullery or back kitchen, coalhouse, and other out-offices very convenient. It is well furnished, and very orderly. The garden, of about 15 roods, is in a high state of cultivation. All the self crops of potatoes, beans, peas, scarlet-runners, onions, carrots, and parsnips are the most vigorous and prolific we have seen. The second crops of cabbages, turnips, cauliflowers, and celery are well filled up and growing well. In this garden everything seems to be grown that is most useful for a cottager's family. It is remarkably clean and neat with the exception of one fence. There are very few fruit trees, except currants, and these growing where the flowers (of which there are a choice collection) ought to be. The walks are well laid out, with box

for borders. A good pig in the sty.—Inspected August 23, 1872."

To William Rogerson, Rushton, being an agricultural labourer, for having his cottage and garden in the second neatest and best order.

"This is a good old-fashioned, roomy cottage, in excellent repair, with two sleeping rooms and out-offices more than what is usually supplied to cottages, but rather too near the dwelling. It is well whitewashed, and kept in clean and neat order. The garden is large with irregular fence, but kept clean and free from weeds. The greatest portion has borne a first crop of early potatoes, and is now re-planted with a useful variety of second crops, chiefly ox cabbages. Every inch of ground is made available. There are a great number of fruit trees, well pruned. The garden throughout is well cultivated.—Inspected August 22, 1872."

To Thos. Walker, Rushton, being an agricultural labourer, for having his cottage and garden in the third neatest and best order.

"This is a small, comfortable cottage, with two bedrooms and suitable out-offices, kept in good order. The garden is small, only about 6 roods, and this divided by a public highway. The tenant labours under great disadvantages, as it is also much sheltered by large trees. Still it is well cultivated, and the second crops doing well under the circumstances. Walker has a great variety of vegetables and flowers.—Inspected August 22, 1872."

Premium 9.—To Samuel Johnson, Little Budworth, not being an agricultural labourer, for having his cottage and garden in the best order.

"This is one of a pair of very excellent cottages, the property of Sir Philip de Malpas Grey Egerton, Bart., M.P. It has a large house place, back kitchen, parlour, two bedrooms, with out-offices very good and convenient, including two pigstyes, both tenanted. The garden of about 10 roods, is of a very dry, sandy soil, and well suited to the present season. Flowers are cultivated to a great extent, but not to the neglect of useful vegetables. A nice ribbon border of showy

flowers is laid out with great taste, and is now in splendid bloom. Roses and other trees are budded for sale. The second crops of vegetables after potatoes are not strong, but very clean. The liquid manure is made available, and we are glad to find at this cottage, and every one we inspected, that a good fat pig or two was kept. Johnson is

the only claimant for this prize, but we think him well entitled to it.—Inspected August 22, 1872.”

In accordance with the recommendation contained in the report, the committee resolved to award silver medals to Messrs Lowe & Jephson, the farmers to whom reference was made.

IMPROVEMENT OF WASTE LAND IN SUTHERLANDSHIRE.

“AN Occasional Correspondent” of the *Times* furnishes a very interesting account of improvements made and still further to be extended on the waste lands of this northern county. The Duke of Sutherland is taking great interest in the matter. His steam plough and harrows are working wonders; indeed, but for the powerful aid of steam, little or nothing could have been accomplished. The correspondent writes:—

The county of Sutherland has a seaboard on the south-east of 32 miles, and on the north-west coast of 57 miles, while the breadth from east to west is 52 miles, with the county of Caithness between it and the Pentland Firth on the one hand, and the county of Ross between it and the Friths of Tain and Dingwall on the other. It contains nearly 3000 square miles, or 1,872,000 acres, of which, at the time of the survey in 1807 only 18,000 were arable, 35,000 in green pasture, 1,571,000 in mountain and moor, 61,000 in salt and fresh water lakes, while 176,000 were peat moss and other waste lands, then deemed to be wholly unimprovable.

Soon after the survey was made, an experienced agriculturist, who had been employed by the Marquis and Marchioness of Sutherland to examine the property and give his opinion as to its capability for improvement, said, in his report:—“Of all the counties in the north of Inverness, the eastern half of Caithness and Ross-shire being excepted, Sutherland appears to me the most capable of improvement. The summit of its hills

may be improved by being planted with larches; its valleys by the plough. There is an immense tract of land, bounded by Loch Shin on the west, and extending to the eastern extremity of the county, of great breadth, and almost flat, capable, in my opinion, of carrying barley, turnips, potatoes, and sown grasses, but now covered with heath, and devoted to summer coarse-pasture of a few miserable cattle.” On the strength of this report extensive improvements were projected. Intelligent farmers from Morayshire were induced to settle on the more improvable lands, while Earl Gower cultivated two farms himself, and such were the results that, in the next survey which was published, the President of the Board of Trade was informed “that the face of the county was wonderfully changed;” that “threshing and meal mills had been erected;” “neat stone cottages built” for the smaller and poorer tenants, while a great breadth was added in succeeding years to the arable land of the county.

But the 180,000 acres of moss and heavy clay lands, difficult to work with much hill-side ground which could not be reached by ordinary modes of culture, were nearly untouched. And here it is that the Duke's experiments begin. Let us visit the district and examine one of them. Leaving the village of Brosa on the sea-coast, with its coal-fields in the rear, we drive up an accommodation road through the strath for two or three miles until we reach a large tract of

noss lying at the base of a hill, which rises up to shelter the valley from the north-west storms. Some of this moss was very deep, but other parts are shallow, with a good deal of clay bottom. Three years ago about 50 acres were laid out as a field to be reclaimed. At first the ordinary process of trenching and draining, so far as practicable, was pursued, and then the steam plough was used. The work done was something wonderful. Where neither horses nor men could have been employed the steam plough tore through everything. It could be worked also with perfect ease, and in a few days the subsoil was turned over and laid out for fallow during the winter. Peat of itself will not answer, but with lime, sand, clay, and guano or other manures it becomes good soil, and ultimately yields abundant returns. This summer the ground was harrowed by steam power. Nothing could have been more satisfactory than the process of harrowing, and now the field is ready for cropping. Under the old system this work could not have been done at all. In some districts where friable peat and hard waste land had been cultivated, the expense was not less than £5 an acre; but here the cost up to the present time is only 33s., and not likely to exceed £2 an acre. Nevertheless, 10,000 acres are marked off for cultivation; but in truth there does not appear to be any limit to the work which the steam plough and harrow may now do among the waste lands of Sutherland.

The only drawback to the perfect working of the steam plough in very rough land, and especially where there are boulders and old tree roots, is the risk of the breakage of gear obstructions. To remedy this defect the Duke is about to work a plough with a revolving cutter—that is, a coulter which will cut its way smoothly until it meets with a root or boulder stone, when it will pass over it with a rotatory motion, leaving such a mark as may enable the ploughman to send a labourer to take out the stone or tree by other means. What is thus done in mosses may be done on hill sides, and the steam plough with its improvements will revolutionize the agriculture of the north.

But the Duke of Sutherland's experiments comprehend more than this. He is utilizing surface peat by making it into composite fuel, and if this succeed a great public gain will accrue to Scotland. The project had its rise thus:—Mr Forrester had a lot of sawdust lying in his way about the mill, when the idea occurred to him that if it could be cemented together with peat it might be converted into good fuel for his engine. He therefore prepared a plan of a machine to do the mixing, and submitted it to the Duke, who at once approved it and suggested some improvements. They were adopted, the machine was set to work under steam power, and in a short time cakes of composite fuel were produced. It occurred to the Duke that if small coal or slack were used as well as sawdust, or without the sawdust, a still better article might be obtained. This was tried, and with promising results. It is difficult to describe this process; but some idea may be formed of it when we state that the machine is erected on a large open space near the mass. It has a shaft 9 feet long. From the centre to the end on which there is no journal there are fourteen knives, with other knives set at right angles, which, are turned at the rate of 120 revolutions a minute. The peat is thrown in, and with the coal and sawdust soon comes out again in a mixed state of sufficient consistency to be wheeled away to the drying ground, where it is put into a mould frame, prepared for the drying field and racked. In the course of a week the cakes are ready for use if the weather be fine, and then it is found that sixty of the sawdust peats are equal to 1 cwt. of best Sunderland coal, and cost 25 per cent. less money, while thirty of the coal composites are set down as of this strength and value. If the cakes can be dried by artificial means, and there seems no good reason why they should not be thus dried, there will soon be abundance of peat fuel in Scotland, and the successful working of this invention will greatly facilitate the cultivation of moss land, for it will clear the way to the deeper moss and the clay which underlies much of it, so that in a few years we may ex-

thing be done whereby the pasturage may be improved, and the number of sheep on these hills thereby increased? In such a summer as we have just passed through grass has been plentiful enough; but in 1870, and in many other summers, herbage on hill and dale has been burnt up. Then not only did the sheep suffer, but there was not sufficient turnip or other green crops for spring feeding, and then mutton became both lean and dear. To meet such a contingency as this, Brown's new system of irrigation is being introduced. That system, as is pretty well known, consists of leaden pipes laid a few inches underneath the grass, with surface openings at intervals, so perforated that at a given pressure the water let in will be thrown by pressure to a height which gives a beautiful rainfall, and may be regulated by the hand to any extent of saturation. Valuable as this process is, considered simply as an irrigant, it becomes yet more useful as a means of utilizing manures, and it is the opinion of the Duke's manager of his home farm that native as well as applied manure may thus be turned to profitable account. Mr Brown, in his reports for 1872, on the working of the system at Stoke Park, near Windsor, and at Bishop Stortford, in Herts, says:—

It has just been introduced on the permanent pasture lands of his Grace the Duke of Sutherland at Dunrobin Castle, and the results there obtained by manure applied to the surface so late in the season as the third week in August, and so far north as Sutherlandshire, have been as striking as those in the south of England. In the course of a few days the grass was changed from what may be considered poor permanent pasture grasses to the richest description of herbage, which warrants the conclusion that the strath lands of the highlands of Scotland may be reclaimed by this system, and brought from their present unproductive condition to that of luxuriant fattening pastures, or where hay may be produced in abundance to provide food for sheep and cattle during the winter.

Now, as there are many mountain lochs or natural reservoirs among the hills, from which water may be led by gravitation to the farms and moor pasture, it would seem that Mr Brown's idea may be to a large extent realized. We saw the pasture to which his report refers in August, when he was laying the pipes down on two acres which had been

railed off in the Castle park, and we saw it again on the 9th of September; and certainly the contrast between the enclosure and the grass around it, some of which we were told had also been manured, was very striking. On Tuesday sheep were put on in the proportion of 25 to the acre, and it is expected that they will soon be in prime condition. This system of watering has been also introduced on the garden terrace, and on Saturday the rain showers were shewn to the Queen, who was much gratified by seeing the invention at work and so successful. With mutton at 11d. a pound in the villages, it is not surprising that the improvements in sheep farming in the county of Sutherland are watched with the deepest interest.

On the same subject Mr James Howard, M.P. says:—

The account published in *The Times* of the Duke of Sutherland's operations in reclaiming waste lands in Sutherland has, doubtless, been read with interest by many other proprietors.

I would direct attention to another "suggestive and instructive fact" of the kind nearer home. Near to Thirsk, in Yorkshire, about 700 feet above sea level, is a moor of some 30,000 acres in extent. A portion of this moor belongs to Major Stapylton, who some four years ago determined if it could be made to pay a fair interest on the necessary outlay, to reclaim his portion of this rough, wild region. The first plot experimented on was 20 acres in extent. After the burning of the heath, the land was broken up by horse power and fallowed. Rape was then sown, a variety of artificial manures being applied, and a portion, as an experiment, was dressed with lime. It was discovered that lime not only acted as a sweetener of the soil, but had the effect of setting the artificial manures in action; for on the unlimed portions the manures appeared to remain dormant. Such were the fertilizing effects produced, that the rape by its growth showed to a foot how far the sowing of the lime had reached.

Encouraged by the success of his first experiment, Major Stapylton determined to bring 300 acres more into cultivation. Having, however, found it difficult and expensive by horse power to thoroughly break through the impervious pan, lying some six or eight inches below the surface, a powerful steam cultivator was obtained, by the aid of which the soil was broken up and well pulverized to the depth of 14 inches. Mr R. E. Brown, who has superintended the work, has kept an accurate account of the cost of these operations and the results.

The operations on the wild heath began as follows:

—The heath was burnt down at 6d. an acre, then twice steam cultivated, each time crossing the other, at a cost of 15s. per acre; then it was left a few weeks to the action of the weather.

| | | | | | |
|--|-----|-----|-----|-----|---------|
| Brought forward | ... | ... | ... | ... | £0 15 6 |
| Then well-steam harrowed thrice, at per acre | ... | ... | ... | ... | 0 7 6 |
| Burning tussacs and roots, &c., and spreading ashes | ... | ... | ... | ... | 0 7 6 |
| Two cultivatings crossing each other, 14 inches deep | ... | ... | ... | ... | 1 0 0 |
| 4 tons of lime, carted and spread, at 8s. 3d. | ... | ... | ... | ... | 1 13 0 |
| 2 cwt. of phospho-guano, at 12s. = 24s. | ... | ... | ... | ... | 1 18 0 |
| 2 cwt. of dissolved bones, at 7s. = 14s. | ... | ... | ... | ... | |
| 3 lb. of rapeseed 1s. 6d., drilling manure and seed, 1s. 6d. | ... | ... | ... | ... | 0 3 0 |
| Rolling, 6d.; horse-hoeing, 1s. 6d. | ... | ... | ... | ... | 0 2 0 |
| Weeding | ... | ... | ... | ... | 0 1 0 |
| | | | | | £6 7 6 |

Good half crop of rape kept 120 sheep one week, at 6d. each

3 0 0

| | | | | | |
|--|-----|-----|-----|-----|--------|
| Outlay left not repaid | ... | ... | ... | ... | £3 7 6 |
| Two ridgings 27 inches wide, and subsoiling 14 inches deep in bottom | ... | ... | ... | ... | 1 0 0 |
| 2 cwt. Peruvian guano and 2 cwt. dissolved bones as before | ... | ... | ... | ... | 1 18 0 |
| Turnip seed, 2s.; drilling manure and seed, 1s. 6d. | ... | ... | ... | ... | 0 3 6 |
| Horse-hoeing, 1s. 6d.; hand-hoeing, 5s. | ... | ... | ... | ... | 0 6 6 |

£6 15 6

One year's interest on this at 5 per cent.

0 6 9

| | | | | | |
|-----------------------------|-----|-----|-----|-----|-------|
| | ... | ... | ... | ... | 7 2 3 |
| Turnip crop, worth at least | ... | ... | ... | ... | 3 0 0 |

| | | | | | |
|--|-----|-----|-----|-----|--------|
| Outlay left not repaid | ... | ... | ... | ... | 4 2 3 |
| Once ploughed with double furrow plough and two horses | ... | ... | ... | ... | 0 6 0 |
| 3 bushels of oats, at 28s. per qr. | ... | ... | ... | ... | 0 10 6 |
| Drilling, 1s. 6d.; harrowing, 1s. 6d.; rolling, 1s. | ... | ... | ... | ... | 0 4 0 |
| Weeding, 9d.; harvesting and thrashing, 20s. | ... | ... | ... | ... | 1 0 9 |

6 3 6

Interest on this at 5 per cent.

0 6 2

| | | | | | |
|---------------------------|-----|-----|-----|-----|-------|
| Total expenses taken down | ... | ... | ... | ... | 6 9 8 |
| 5 qrs. of oats, at 28s. | ... | ... | ... | ... | 7 0 0 |
| 30 cwt. of straw, at 2s. | ... | ... | ... | ... | 3 0 0 |

10 0 8

Expenses brought down

6 9 0

Profit for the four years

3 10 4

EXPENSE OF WORK DONE.

| | | | |
|--|----|---|---|
| Total expense of wearing parts, repairs, oil, and grease, as per bills for the 18 months | 56 | 8 | 0 |
| Wire rope, nearly one-fourth worn | 23 | 0 | 0 |
| | 79 | 8 | 0 |

This, on the 967 acres cultivated, gives about 1s. 8d. per acre for wear, &c., of tackle. To cover interest and depreciation of capital invested, 10 per cent. must be charged on £682 for 16 months 102 6 0

This gives 2s. 2d. per acre for this item.

WORKING EXPENSES PER DAY.

| | | | |
|--|----|----|---|
| One engineman | £0 | 3 | 0 |
| Four men (two anchor, one cul- tivator, and one porterman), at 2s. 6d. | 0 | 10 | 0 |
| One boy at 1s. 6d., and a horse at 3s. 6d. | 0 | 5 | 0 |
| 6 cwt. of coals, at 8d. | 0 | 4 | 0 |

968 acres in 176 days, at . . . 1 2 0—193 12 0

968 acres, at 7s. 9d., or under 176 days, at
£2, 2s. 8d. £375 6 0

From the above it will be seen that after all expenses are paid a fair profit is realized, besides the land being in first-rate condition to go on with in a regular course of farming.

Before the introduction of artificial fertilizers, the difficulty and cost of transporting manure to so great an altitude rendered it impossible to cultivate such land to a profit; but what with powerful steam machinery and portable manures, the difficulties are greatly diminished, and there is no question that large tracts of similar land might be profitably brought under cultivation, or, at all events, laid down to grass.

When on the moors of Derbyshire and Yorkshire last month, small farms I saw dotted here and there with beautiful green sweet pastures showed that to a considerable extent these moors might be turned to account for the summer grazing of sheep and cattle.

Wealthy lowland farmers would be only too glad of the opportunity of taking such farms, as are the upland farmers of Scotland of holding the hill farms.

It is not only the hill farms, but the lowland farms, which would be a boon to the country. The hill farms, which are now almost all in the hands of the tenant, would be a boon to the country. The lowland farms, which are now almost all in the hands of the tenant, would be a boon to the country. The hill farms, which are now almost all in the hands of the tenant, would be a boon to the country. The lowland farms, which are now almost all in the hands of the tenant, would be a boon to the country.

all England, when it becomes necessary to sell. I most strongly object to tenant-right in any sense. All contracts should be free. At this moment I am, with all other Irish landowners, a great sufferer by that most unwise and unjust measure, called the Irish Land Bill. Tenants there ride rough-shod over the owners of property. They object to an increase of rent when leases fall in, they decline to purchase at anything like value, and they threaten to murder any man who dared to take a farm at a higher rent than they are willing to give. In case of going before the barrister appointed to decide between the parties, the tenants produce any number of witnesses to prove what they have done, at least three-fourths of which is positively untrue; these barristers, who are a respectable, and often a clever set of men, are bewildered, but consider that they are bound to carry out the Act, although some are ready to admit its injustice. My Irish property is let on 20 years leases, at moderate rents, with the full understanding that at the expiration of the term a fresh valuation would be made. Some open lands at 2s. per acre, which now, fenced and drained, are well worth 18s. or 20s.; men there, commencing with their own labour, now rich and comfortable, but ready to ask for compensation, although they have been repaid five times over.

Here good tenants require £13 per acre to take a farm; it used to be £10. Small bad farmers have neither the money nor ability, as a rule, to farm tolerably well; and they will gradually be obliged to retire, which I consider a misfortune. My great difficulty is to impress on them the absolute necessity of education for their children.

Mr Mechi's reply is as follows:—

There can be no doubt that the proper conversion of our common lands is a paying operation, and no better evidence need be adduced than that which your lordship gives of the success and wealth of your Irish tenants, who have done so. I presume that our Land Improvement Companies would make the necessary advances on the security of the land. It appears to me that the reclamation of our waste lands presents to these companies a vast field for the investment of the capital which awaits their demand for it, could they find opportunities for its utilization, which has not hitherto been the case. It certainly does appear anomalous that while we are constantly deploring the want of capital in agriculture, we, as landowners, must to apply for it, although abundantly available. The value of such unreclaimed land could be easily ascertained. Hereabouts it would readily command from £5 to £10 per acre. Most of our heath in this neighbourhood has been reclaimed and converted into good land, and although the cost has been considerable, I hear no complaints as to its not having been a profitable operation. In fact there is always a ready sale for unreclaimed land. The landowner's outlay would probably vary from £5 to £15 per acre for fencing, roads, farm buildings, and draining, where the latter

ed. Such land, when put into fit condition investment of a large tenant capital, would command from 20s. to 30s. per acre rent. How our land is really in a fit condition for the investment of tenant capital? Where are the roads and fences, the covered yards, good s' cottages, the suitable residence for a well-d tenant? Is not draining still to be done on our land requiring it?—so says a great man, Mr Bailey Denton, therefore I feel justified in saying that on well-conditioned reclaimable land a high rent might be obtained from a dependable

tenant. There need be no outlay on the part of the landlord or the interest charged by the Company, which would pay for the improvements at 6½ per cent.

This would cover ordinary principal and interest for twenty-six years, so that, at the termination of this period, there would be no longer any charge on the land. How much of the 6½ per cent. is to be paid annually, in fair proportion between the landlord and tenant is an affair of agreement. In one case of draining, if the tenant paid it all, he would be a considerable gainer, although that would be equitable, because I look upon draining at 4 inches in strong clays as an almost permanent improvement, provided that the work is well done, and is carefully watched, which is too often not the case, and for which the tenant should be made responsible. My experience teaches me that the drains in heavy soils should be nearer to each other in a dry climate, 30 feet being the maximum and 14 feet the minimum distance. As to the value of a lease to a tenant who effected all these improvements and improvements at his own cost, I consider that twenty years would not be more than, on such conditions, he would be entitled to, paying of course only the land rent during that period.

These matters could be well calculated by some well-known able and equitable land valuers. I do not agree with your lordship's opinion about the right, because I look upon it as the basis of good agriculture. No one, I think, can doubt it; I read the digest of the evidence on this subject before the late Mr Pusey's House of Commons Committee in 1849. This digest was prepared by Mr Shaw & Corbet, of the London Farmers' Club; a reprint may, I believe, be obtained at Mr Bell's, 265 Strand, price 3s. 6d. It contains the evidence of fifty eminent landowners, land valuers, and

In the case of your Irish tenantry, it appears from the evidence that they alone have effected the conversion of waste lands, and are, therefore, entitled to their fair share of the resulting advantages. In strict equity your lordship could only have enhanced rent which the land, still unimproved, would have now commanded by the efflux of changed circumstances.

My experience, as regards the veracity of the lower

orders of Irish, corresponds with yours, for as a magistrate of London, in numerous cases of assault, battery, &c., from the Irish colonies within the City, I have often been puzzled and amused by their easy conscience in the matter of oaths, for which, however, due allowance should be made.

We have unmistakeable and satisfactory proof in Lincolnshire of the national importance of tenant-right by its great encouragement of ample and increased production. The custom of the country there renders the question of leases quite secondary, because a tenant can safely farm well up to the last moment of his occupation, and then enter upon another holding also well farmed and unexhausted. This is a matter of great advantage to the nation, for the full production of food by good farming is continuous, while, under the ordinary system, several years are occupied in exhausting the land, and as many more in endeavouring to restore the lost fertility.

Even with the Scotch nineteen years' lease, which has caused so much improvement, this "taking-out" system prevails, because there is no compensation to the tenant for any portion of his unexhausted improvements.

It is to be hoped that in the course of time something like a systematic and uniform practice of valuation at outgoing may take place, where the conditions are similar. If the Legislature once enacted a general principle of valuations for tenants' unexhausted improvements, our able land valuers would soon shew themselves capable of estimating at their fair value the proper allowances. In many parts of Ireland the tenant has dug and reclaimed the land, built his own hut, house, or sheds, the land-owner having only provided the bare waste. Is it not natural, under such circumstances, that the tenant should look upon his own improvements as his own property, and that the feelings of irritation and injury upon eviction or greatly increased rent, should, in the absence of a legal valuation of unexhausted improvements, and in the case of a vivacious and excitable people, find vent in illegal proceedings? For in Ireland it is almost to the land alone that the population look for subsistence and employment. We all know that in towns and cities no tenant would be so unwise as to effect improvements without a lease long enough to recoup himself for his outlay, or a valuation of such improvements. I can readily perceive why your lordship's feelings about tenant-right are adverse. Your lordship, in your own county, is known and esteemed as a clear-headed man of business, with perfectly equitable feelings, and a right sense of a landlord's duties and responsibilities. Your tenants, if worthy men, may be said to have an almost certainty of the renewal of their leases on equitable terms; you assist them in their improvements, and are anxious to adapt your property to modern requirements. Many other noble owners do the same, but in too many instances all this is wanting, and as, in business matters, people are not saved by faith, but by the want of it, we must lay down as a

expended in consequence of the farmer on many estates knowing that at the end of 19 years he must either be prepared to give an extravagant increase of rent or quit his farm, and therefore his improvements are of a superficial and temporary nature. Millions of money have in this way been lost by the farmers of Scotland, and much by the proprietors themselves from the indifference of the latter. It is truth when I say that the cultivated land in this country is still not more than half-drained, and even much of that within a radius of 10 miles of the two largest cities in Scotland. Many proprietors in this country have dreamed away their opportunity. Those sensible men who have thrown out inducements for improving tenantry, for men of capital and intelligence, and who have invested the surplus capital accruing from their advanced rents in the necessary buildings, in the drainage and proper fencing of their estates, will now reap their reward. Many of those proprietors who have large landed estates on high situations, on account of the want of success and the appearance of exhaustion from its previous cropping in the last century, strictly prohibit their tenants from breaking them up; by doing so, they restrain the employment of the capital of others, and limit the agricultural population which they would naturally employ, forgetting that the advanced system of growing green crops, and the rearing and fattening of sheep upon these lands, would renew them to their pristine vigour by adding to their potash, their phosphates, and by bringing their latent vegetable and mineral constituents into play, thereby doubling their productions. Many proprietors of land have uniformly accepted the highest offers for their farms, without regard to men or capital. These men will now suffer for their short-sighted policy. No sensible man will now, with an ordinary lease, begin the wholesale drainage of his land with his own capital unless he knows that he is dealing with men of strict integrity and honour. The value of drained land will now be better understood than ever, and from its enhanced value the undrained land will be

many degrees less valuable. From the present and prospective change in the price of labour it is not at all improbable that much land in this country will ultimately go out of regular cultivation; but at any rate the rapid progress of advancement which has gone on for the last generation will now receive a check. Were we even able and willing to pay for the labour at its enhanced value, where are we to find it? There is, no doubt, plenty of work in draining, trenching, fencing, &c., for an agricultural male population of one-half more than there now is, but the bone and sinew of our country have left for the backwoods of America, there to till and plough for themselves, and to send their surplus grain to supply the deficiency of our own productions, when many of these men might have been profitably employed in draining and trenching in their native parishes, and that, too, since the effects of draining were well understood, and when labour could be had at one-half the price it now is. The agriculture of this country will now go slowly on till the inducements for emigration held out by the various colonies are lessened from the price of labour being better equalized with other parts of the world.

INSECURITY OF CAPITAL INVESTED IN THE SOIL.

The insecurity of capital invested in agriculture and the slow and inadequate returns derived from it, as compared with general investments in the commercial world, no doubt partly arises from the want of "tenant-right," and also from the extremely unsatisfactory state of the game and other land laws, and must in some degree attract those who have money from the cultivation of the land, together with the great inducements held out by the various colonies and the ultimate large returns made in those countries where money is regularly and in most cases safely lent out at 12 to 15 per cent. to those who have not adequate means of their own for the rapid improvement of their estates. Most farmers are at this day pushing their sons into other professions from these causes and from the circumstances of their being

unable to afford them such sums as would enable them to stock respectable farms. The present state of the game and other land laws, and the clauses anent them which are inserted in almost all leases, is certainly discouraging and humiliating in many cases to the farmer. The least that can be said of it is, that it is unfair to extort the highest agricultural rent for land, and to burden the tenant with an overstock of game. Several of my friends who have large farms, the proprietors of which live at a distance, and have little or no interest in the game laws, have occasionally the kindness to give me a day's shooting. On these farms I find there is always a good stock of game with no appreciable damage to crops, and I hold that a fair and sufficient head of game can be kept up without any very apparent damage. With regard to rabbits, from whose devastations I have suffered largely, I should say the farmer who signs away his right to destroy them is more than foolish, as no valuation whatever can compensate him for the ravages of these vermin. I should be sorry to see the game laws entirely done away with, as in my opinion, no Trespass Act would suffice to prevent many people of indolent habits from leaving their legitimate occupations and indulging in those pursuits that become doubly attractive when the gain they produce is added to the pleasure of the sport in obtaining it; and, moreover, I think that were these laws abrogated, game would speedily be exterminated altogether. It is, however, absolutely necessary that all who pay an agricultural rent for land, and who keep these animals under the head of game, should have an equal right with the proprietor to appropriate to the ground game, if he chooses to do so.

With a proper system of game laws, I have every confidence that the number of them would be increased, and that the farmer of former times would be able to do with little or no education, and the farmer of the present day, and the farmer of the future, would be able to fill the places of the former, and, last, or ought to, have a good education.

TO MANAGE PROFITABLY.

Though it is essentially necessary that the agriculturist of the present and future day should be able to deal liberally with whatever subject he has in hand, it is also of much consequence that a proper economy be exercised with a view to bring what capital he has to bear fruit as early as possible. It is well to understand the proper cultivation of the land, though the best of farmers, with adverse seasons, will be disappointed, even with the most sanguine and arduous endeavours. Many hard-working men are, however, "penny wise and pound foolish." They will agree to pay several pounds of rent per acre for their land; for which they will purchase several pounds worth of foreign manures after having drained, and probably limed, it at a very considerable expense; but with a view of saving they will often plough the land wet and out of condition, and thereby reproduce the very acidity for which they had purchased the lime, and in a manner destroy the productive powers of the land for, at least, one rotation to come. Large sums have been expended by some in the purchase of steam-engines with ploughs and other implements for the deep cultivation of the land. Since the introduction of these we hear of land being tilled to the depth of from fifteen to twenty inches. Deep ploughing is, no doubt, in many cases of great importance where it is done judiciously, and ultimately has a permanent effect in increasing the capital in the soil, by enlarging its powers of filtration, &c., but the man who thinks of cultivating his land in such a manner ought to consider, first, his capital in hand; second, the subsoil and strata with which he has to deal; and third, the length of time he is to have an interest as tenant in the land. The expense of cultivation is very much greater, and the quantity of manures for a time also requires to be considerably augmented, and in many cases the land will produce less for the first and often second rotations than it would have done with ordinary cultivation. I do not mean to condemn deep cultivation on certain classes of land, but a good close

of 10 inches will, I maintain, give a and quicker return for the capital expended than any additional depth that can be obtained, that is, if the condition of the land is suitably kept up. From the high prices of stock and the small margin left for feeding it is at present, we ought perhaps, with care to breed even more than we do, to have a larger part of the feeding to be done by those who have lands and climate better suited for it. The aim of the stockholder is to make the quickest and largest return, and with the high-class feeding he knows he must at a glance be able to tell whether or not his animals are making proper advancement with the relative expenditure. In the use of extraneous manures,

he must be able to tell what proportion of ammonia and phosphates is requisite with the condition of his land to produce certain crops; and in the use of foreign foods for the feeding of his stock, he must in the mixing of these and in the using of them as auxiliaries to his own, find the most economical at given prices, or what will produce the largest amount of flesh and fat at least cost to himself, always bearing in mind that if at the marketable value of the lean stock, and at the cost of his extraneous foods, with the price that he gets for his fat, he has at once a direct profit, he is adding no less than 20 per cent. of his outlay to his capital in the soil by the residue left in the manure of the animals.

SOMETHING ABOUT DEER FORESTS.

MR JAMES W. BARCLAY has been investigating the subject of deer forests, with a view to ascertain the profits which would possibly accrue to the proprietors if sheep were grazed on the vast extensive pasture at present given up entirely to the support of deer in the north of Scotland.

The results, as communicated to the *Leven Free Press*, are as follows:—

Fortunately there is still in Braemar sufficient sheep farming to show what may be done with sheep in that district, and to form a basis for determining, with practical accuracy, the capabilities of Mar Forest as sheep grazings.

The farms of Baddoch and Auchallater, on the Braemar Estates of Invercauld, lie contiguous to Mar Forest, and are occupied as sheep grazings and grouse shootings. They are situated in the upper part of Glen Clunie, on the north face of the Grampians, and extend from within about 2 miles of the Dee, up to the summits of the range. Mar Forest bounds Baddoch farm on the north for 4 or 5 miles, and extends down to the Dee, near Castleton. From this south-

east boundary the forest stretches north-westwards round the sources of the Dee, covering the slopes between Aberdeen and Inverness, and the southern faces of the mountains which rise from the left bank of the Dee to Benmuichdui and Bena'an. The lowest part of the Baddoch grazings is 1400 feet, and of the Auchallater 1250 feet above the level of the sea. Not over 1000 acres of both farms lie under 1500 feet, and the average elevation of the whole may be about 2000 feet. Judging from inspection of the Ordnance Survey Map, the average elevation of Mar Forest is not greater than that of Baddoch and Auchallater, and on the whole, skilful sheep farmers thoroughly acquainted with the district, are of opinion that the capabilities of these two farms as sheep grazings are certainly not greater than the average of Mar Forest.

The population, stock, produce, and rent of these two farms will therefore form a basis for determining with substantial accuracy the population Mar Forest would employ, the number of live stock it would maintain, the quantity of butcher meat and wool it would

portion adjoining the village of Castleton, the strip of land between the Dee and the road on the south side of the river, and the factor's farm. The few acres cultivated, within the limits I assign to the deer forest, are more than balanced by the cultivated acres in the land excepted on which the deer feed. The area of the forest as thus defined, called herein Mar Forest, is about 90,000 acres, or nearly 140 square miles, and includes, it is estimated, over 200 acres of land once under cultivation. Mar Forest is thus four-and-a-half times the extent of Baddoch and Auchallater; and, compared with those farms, its capabilities are four-and-a-half times greater. Mar Forest could, therefore, carry in summer 30,600 sheep, 135 cattle, and 13 horses, and produce in mutton and wool £11,819.

The stags and hinds annually killed in Mar Forest do not exceed 400, probably not 300, and yield a certain quantity of venison; but, as the produce of the 135 cattle Mar Forest would maintain in addition to the above sheep has not been included in the above calculation, nor the extra quantity of grouse killed if under grouse shootings, the sum of £11,819 is *increase* in value of the produce of Mar Forest if occupied by sheep instead of deer. This is, however, actually an under-estimate; for it is assumed (1) that the whole of the stock is sheep, whereas it would be more profitable, instead of fully stocking with sheep, to summer a considerable number of cattle, which would be fattened off on turnips in the low country; and (2) that none of the sheep would be kept at home over winter, whereas a considerable stock of ewes might be wintered in the Forest. On the whole, then, on a very moderate calculation, Mar Forest, if devoted to pastoral purposes, would yield to the nation annually butcher meat and wool to the value of £14,000 to £15,000 more than it does at present.

The farms of Baddoch and Auchallater, the latter including Newbigging and Coirenaleirg, extend to about 20,200 acres (say 20,000), whereof about 50 are arable. Grain crops ripen on Baddoch—elevation 1400 feet—on the average once in two years; and on Auchallater—elevation 1200 feet—twice in three years. When the grain does not ripen, the fodder is used for winter keep. The sheep stock thrives well, and the three-year-old wethers are as strong as any on Deeside. The rent paid by the sheep farmers is £735. The grouse shooting on the two farms is included in a larger extent of moor, and let to a separate tenant. The live stock consists of 6750 to 7000 sheep (say 6800), all wethers, except about 500 ewes, 30 cows and other cattle—whereof about two-thirds are kept all winter—and 3 horses. To tend the stock and work the arable land, 12 to 13 men, and 3 women, besides the farmers, are employed all the year round, and eight additional shepherds are required from October to May, besides extra hands at shearing and dipping. The sheep, according to their age and the season, leave for the low country between the middle of October and the end of November, and leave the low country for the hills in April. About 2200 wethers (reckoning the few ewes as wethers,

... life is expected to decrease except the

Ma Forest might be divided into ten sheep farms, averaging 3000 sheep each, giving employment to sixty-five shepherds

er servants all the year round, and the additional shepherds would be in the low country in winter. Were procurable, there would be on each besides the farmer, two families, and as require about as many keepers as deer, sheep-farming population would be *in* to the present inhabitants. Instead, e, of its present population of ten (excluding the shooting parties), forest, if occupied as sheep grazings house shootings, would maintain forty besides forty-five servants, and esg each family at four persons, a popu- f 205 including servants, against the 40—without reckoning the trades- and others the enlarged population support.

RENT.

sheep grazings alone, Mar Forest in the same proportion as Baddoch uchallater, fetch £3307 10s. ; but a f say £307 10s. would have to be de- for interest on houses for ten sheep —leaving £3000 as the grazing rental Forest in its present state, excluding lue of the six shooting lodges. The shootings of 90,000 acres, with lodges, certainly fetch £2000, and Mar Forest, s grazings and grouse shootings, would eld at least £5000 of annual rent. In he whole of the Forest was entered in essor's valuation of the country at 0; in the roll for 1872, just made up, ount is raised to £3058. Of the sum, £2310 is for shootings alone, the latter, £2650—the balance being , policies and woodlands. It has been that deer will exist where sheep can-

not. From all I have been able to learn the reverse is the fact. Sheep will live at a higher elevation and on scantier food than deer, and if together in the same forest, sheep, if sufficient to stock the grazing, will soon drive the deer elsewhere. The increasing cost of wintering hill sheep is urged as an objection to increasing their number, but if wintering costs more, has not hill grazing also advanced, and sheep still more? Lowland farmers complain of the scarcity of store beasts to consume their turnips, and the great rise in the price of store sheep during the last few years proves their scarcity. Without, however, discussing the point at length, the agriculture of the country may be safely depended on to adjust itself to provide for the maintenance of sheep, so long as it is profitable to produce mutton and wool. Mar Forest for sheep grazing, although an average of Aberdeenshire forests, is not equal to those in the adjoining counties, but, in the absence of fuller information, the comparative statement given above may be accepted as not over-estimating the average capabilities of deer forests on the east coast of Scotland. With similar information regarding an average deer forest on the west coast, and, in addition, the total area of Scotland under deer forest, which the Ordnance Survey Office may be able to supply, a practically reliable estimate could be formed of the number of inhabitants sacrificed to form solitudes for deer, and the loss of butcher meat and wool by substituting deer for sheep.

I have only to add that the reasons for selecting Mar Forest are its being the largest and most compact in Aberdeenshire, and its boundaries the most easily defined.

to the bottom, and consequently there are no horizontal screws or ascending and descending dredging buckets for clearing out the sludge. There are no extensive and costly beds to arrest the particles held in suspension by the sewage percolating through the soil, and requiring renewal after a certain period of use. Neither is any elaborate contrivance of revolving screens, or indeed, any machinery whatever, adopted for straining the turbid sewer water. Hence, it is quite possible that the ingenious plan found effect for its purpose at Bishop's Stortford may not be viewed with much favour by Sanitary Engineers whose ideas are apt to run upon complicated contrivances, clever mechanism, massive erections, and so on. Economizing space and the principle followed is to intercept the solid matter in the stream of sewage, when quiescent, but while it flows; and the merit of the invention lies in the discovery of a screen which allows the liquid to pass rapidly through, yet detains nearly the whole of the suspended particles. Embankers at the marshes know well enough that a screen staked upon the surface flooded by the water will collect in its interstices the slimy matter which is carried in the turbid current; and by accommodating to a different use this method of accelerating disposition, the Stortford plan essentially consists in passing the sewage horizontally through a vertical screen made of faggots. In one of the small settling tanks (from which the sewage passes through iron gratings to the pumps), Mr Odams has placed an upright wall of osier-beds about 18 inches in thickness, and standing 5 feet across the current of sewage through which it flows. Perhaps common faggots would have been still better, and the thickness as well as minimum surface area of the screen must depend upon the volume and velocity of the current of foul water to be dealt with by passing through. At Bishop's Stortford the faggot-screen at 5 feet breadth standing some 4 feet into the water presents a surface area of about 20 square feet, and this is found sufficient for the settling or filtering of filthy sewage passing

through at the rate of about 700 gallons per minute. Large solids, bits of paper, &c., together with a portion of the slime deposited upon the obstructing face of the faggot wall, fall to the bottom of the tank, which for this purpose is made deeper than the lowest part of the screen. The sediment which collects upon the interstitial superficies of the faggot bundles has to be extracted, say twice a week, in order to preserve, or, rather, continually to renew their straining capacity; and this clearance is accomplished in the easiest manner imaginable. The faggots being raised out of the tank, there is directed upon them a jet of the clarified sewage issuing under pressure from a flexible tube and hose, when they are washed clean almost instantaneously. The jet of course is drawn from the main pipe which conducts the sewage from the pumps up to the farm. Immediately behind the faggot wall is a flat vertical screen of copper wire gauze, of fifty meshes to the linear inch; so that very fine scum which may find its way through the apertures of the faggots is caught upon its surface. The gauze, stretched upon rectangular frames sliding in grooves, can be withdrawn in sections, for the purpose of being occasionally (perhaps daily) cleansed by a douche, in the same way as with the faggots. This arrangement is the invention of Mr Isaac Brown, of Edinburgh. While the unscreened sewage has a very offensive odour, the sewage after flowing through the screen is comparatively sweet: it can be applied in irrigation with scarcely any perceptible smell, and as it is so far clarified as to be but very slightly cloudy, it is free from liability to deposit noxious sediment in carriers and gutters, or upon the blades and leaves of plants. It will be observed that the solid matter of the sewage is obtained in mass without the addition of lime, clay, or any chemical ingredient whatever; so that the weight of sludge to be dealt with is only that originally present in the discharge from the town drains. Mr Odams' proposal is to mix with the sludge (after removal with the tank) an equivalent of dry earth, loam, clay, or whatever soil is readiest to hand, the necessary

weight of earth being probably less than that of the sludge. In this state he expects that farmers will fetch it away and pay for it, say 5s. a load. This would be a sufficient price to cover all expense of manipulating the solid part of the sewage. In the case of a town ten times the size of Stortford, that is, with 60,000 inhabitants, there would be, at the above rate, 20 tons per week, or say 3 tons per day, of this waste mud to dispose of, which certainly does not appear a very formidable or costly business.

And now for the utilization of the screened and clear liquid which carries, in solution, the really valuable constituents of the sewage. The ground requires no levelling or casting up into ridge and furrow, or shaping with uninterrupted gradients, or any other preparation of the surface whatever. Mr Odams takes the land in hills and hollows, just as he finds it; and without delay in contouring or expensive formation of beds, he lays down in parallel lines, 33 feet apart, lead piping of 1½-inch bore. Tiny holes (two, three, or four together) are pricked at every 2½ feet along the upper part of the pipe; and the sewage, forced by the steam-pump, issues from the holes like a sparge spirting up to a height of 10 feet or 15 feet, and then falling upon the entire surface of the field in a finely divided or drizzly shower. The arching jets of spray spanning to 20 feet on each side of the pipe, not only leave no spot unwetted, but distribute the gentle streams equably over every square yard; the long rows of permanent fountains—playing continuously, intermittently, or as regulated by the turning of a tap-valve—resembling the action of so many enlarged gardeners' water-jets, as made in the modern style, with long straight, perforated nozzles. From the fine wire-gauze strainer, through which the sewage has been taken, there is no chance of the holes becoming choked, and the pressure is sufficient for blowing the mud into the air, so that it accidentally enters a hole, and is blown up from any hole. The simple system is the simplest in the world to put into practice in the same place. By

corks or stoppers at the ends of the several lengths of pipe, provision is made for flushing out any sediment which might gradually collect inside. The pressure required is that of a head of water of 25 feet. That is, whatever power is expended by the steam engine in raising the sewage to the level of the field must be increased sufficiently to lift the water 25 feet more, or, in other words, the motive power in all cases is represented by a lift of 25 feet beyond that necessary for surface-flooding. The lead pipe lying just below the surface, with small iron shields protecting it at intervals of 2½ feet where the holes are exposed, scarcely any part of the ground where old pasture land is under treatment can be regarded as occupied to the exclusion of herbage; while, in case of arable culture, tillage operations can be conducted close alongside the pipe; so that a much less proportion of the surface is abstracted from production than by the system of open carriers and gutters. All nuisance is avoided. With the absence of channels or small ditches, there is of course the absence of the foul mud which gathers and creates a stench in them; and, contrary to what might be expected, there is no offensive effluvia from the sewage spray, the coarse filth having been removed by the effective screening, while the fine division of the liquid by the jets, bringing it into intimate contact with the atmosphere, probably secures an immediate oxidation of the finer matter. The great advantage claimed for the new system is that, by artificial showers, it applies the fertilizing liquid with the utmost economy, as well as in the manner most natural and beneficial both to plants and to the soil. Not a particle is wasted, unless it be by evaporation, which is not considered to be serious in amount. The crops of grass cut upon the acre of old meadow land now under experiment at Bishop's Stortford certainly tell wonders in favour of this good imitation of natural irrigation. We understand that the entire outlay for the lead piping amounts to somewhat less than £30 per acre. This, indeed, exceeds the general cost of preparing land for ordinary

5. For though the cost of preparation at Aldershott was £40 to £50 per acre, that for Merthyr Tydfil is said to have been very much more, the work at Bedford, using the covered earthenware pipes, was done for £10 per acre; and from the experience at Lodge Farm, Barking, at Mr Breton Farm, near Romford, and at other places, the average expense of laying

out may be considered to be about £15 per acre. But there is this important consideration—the lead remains at all times marketable at about three-fourths its original value; and, what is a great saving, no manual labour or attention is required to keep the field apparatus in order as with carriers, gutters, drains, stops, hatches, &c., in overflow irrigation.

THE POTATO DISEASE.

Following is Dr Carpenter's opinion about the potato disease:—The large number of letters and reports upon the potato which you have published shews the interest which attaches to that matter. The reporters appear to me to have made the mark as to the cause. They cannot, however, recommend the proper remedy for its removal in future years, while many of the suggestions which have been made, if acted upon, will certainly increase the evil in future years. Some writers even throw doubt upon the origin of the disease, but all practical men are convinced that it is really due to the fungus *Botrytis infestans*, or, as some choose to call it, the *Peronospora infestans*, for the fungus is known by both names. The disease is allied to the *Botrytis Bassiana*, which caused the epidemic among silkworms a few years ago, called Muscardine. As we can possibly point out a satisfactory remedy for the disease, it is requisite to know something of the natural history of its producers. The natural history of the family is properly understood, it will at once be seen how useless many of the suggestions which various writers have made in your columns. There is really no difficulty in procuring the growths at any time and in any place, and the requisite factors are present, viz., a proper degree of moisture, of heat, of food, and atmospheric conditions required for the development of the sporangia, which abound in the atmosphere. In the majority of instances the cause will be forthcoming, and will soon bear proof of their existence, though they may be invisible. Whether it be the rot (*Merulius lachrymans*)—which has

just made its appearance among the new timbers of Croydon Church, because the necessity for proper ventilation was ignored—or whether it be the *Torula cerevisiæ*, which provides for us our malt liquor—or the *Botrytis infestans*, which destroys our potatoes, the effects will be produced if the whole of the requisites are in conjunction. The architect who neglects ventilation will introduce the *Merulius lachrymans* without being required to plant the germ; the brewer will not get a properly fermented liquor unless his arrangements are right as to sugar and temperature—while the potato-grower will lose his crops every few years unless he takes means to keep the germs of the disease away from his seed.

The present custom of storing the seed is at the root of the matter, as far as a general epidemic is concerned. It is well known to fungologists that fungi have their times and seasons, as well as other plant growths, and that certain spores exist, which are called "resting spores," from their custom of biding their time and coming to maturity when the season for their development is present, remaining uninjured by changes of temperature and by considerable changes of their physical state, and which are not destroyed unless an actual chemical change is produced in them.

These "resting spores" are produced in abundance in the places in which seed-potatoes are ordinarily stored; they bury themselves in the eye of the potato, and are planted with it.

These spores will not produce mycelium or spawn, unless the proper juices are ready for their development, and not then, unless the physical agencies are also at hand—such as a proper degree of moisture, heat, and the proper

kind of exhalations from damp, unventilated ground, with some disturbed magnetic state of the earth and air. These adjuncts are as necessary as the sugar in the sweet wort used for the production of beer, or the absence of ventilation for the production of dry rot.

The tuber is planted with the "resting spore" in its eye; it sends up its haulm with the spore in its tissue. Just about the time of flowering the juices in the plant are matured sufficiently for the "resting spore" to develope; if then there should be the conjunction of circumstances I have mentioned, viz., moisture, undrained ground, and electric disturbances, with luxuriant tops to the plants, the fungus is developed in the most marvellous manner, and millions of spores are wafted over the field, not resting, but immediately growing, sending their mycelium into the stomata, or breathing pores, upon the plant, and in a few hours poisoning the whole of the crops by interfering with the proper maturation of the juices. Every potato receiving juice from a diseased haulm will suffer.

The growth of the fungus arises from its abstracting an important part of the juice of the plant, so that the character of the circulating fluid is quite altered; and a similar result happens as is the case when a human being is deprived of the oxygen required for active respiration, or if some other gas is respired. The blood is altered, and if the alteration is continued long enough, death results. No doubt highly-manured lands and crops dressed with artificial manures beyond measure more easily succumb to the disease, just as is the case with highly-fed, richly-seasoned human beings, whenever fever gets hold of them they rot most rapidly. So also if plants are infested with insects, such as the *Euptryx picta*, they will more easily yield to the disease because they contain less mineral matter in their tissues; but such are not causes for the disease. The cause is the fungus *Botrytis infestans*. The remedy is to destroy the fungus by burning, and to treat the soil by the use of lime, and to treat the plants by the use of sulphur. The growth of the fungus is not prevented by the use of lime, but it is destroyed by the use of sulphur. Care should be taken to destroy the fungus in the haulm, and to treat the soil by the use of lime, and to treat the plants by the use of sulphur. A seed potato should be selected which is clear of the disease, and should be planted in a clean, well-drained soil. It is contrary to the common practice to plant a seed potato in a soil which has been previously infested with the fungus.

treated with a dressing of some material which prohibits fungoid growths, such as chloralum, preparations of carbolic acid, or creosote, and then stored in a dry, well-ventilated chamber, where the temperature shall range between 35 deg. and 45 deg. If they shew signs of sprouting they should be immediately planted, for the removal of the early sprouts takes away much of the mineral matter out of the tuber. Common sense will dictate the measures which should be taken for the proper ventilation and drainage of the soil in which they are planted. If these rules are carried out, I feel convinced that the disease will be reduced to a minimum, and a general epidemic be seldom possible; at the same time, seedlings and fresh soil appear to me to be as necessary as in every other kind of cropping.

I write these suggestions in the belief that one law governs the action of disease, whether in plants or in human beings, and that it is easier to destroy the "resting germs" than to stay their effects. It may be urged against this view that the tubers used for seed could be destroyed by the germ in the eye, but it is one of the points in the natural history of the *Botrytis infestans* that it feeds upon the juices of the growing plant, and the matured potato is not growing, therefore the concurrent circumstances requisite for its fertile development are not present. The "resting spore" continues such until all the circumstances are favourable for its growth. It is carried upwards in the haulm until its proper season arrives. This may not come; it may be too dry, or there may be no magnetic disturbances, or these changes may come too late—then no epidemic.

I should mention that after the tuber has been infested by the *Botrytis*, its destruction is completed by another fungus, the *Fusisporium Solanii*, which changes its form as the work of destruction proceeds, hardening some portion of the tissue of the potato, but changing the major part into a gelatinous, stinking mass, by means of which the starch is destroyed, while the gluten and the juices proper appear to be the food upon which the *Botrytis* flourishes. Therefore, Dr Hooker's suggestion be carried out, for saving the starch, it must be done before the *Fusisporium* is developed.

The Garden.

CAMPANULA MEDIA CALYCANTHEMA.

Lovers of the grand, old-fashioned, seedsman. We are indebted to the
and showy Canterbury Bell, must hail Messrs Waite, Burnell, & Huggins, of
delight this new addition to our hardy Street, London, who have just brought



Campanula media calycanthema.

For lovers of the grand, old-fashioned, seedsman. We are indebted to the
and showy Canterbury Bell, must hail Messrs Waite, Burnell, & Huggins, of
delight this new addition to our hardy Street, London, who have just brought

however, be borne in mind that the plant is of necessity much reduced in size, and consequently fails to impress the beholder with its magnificence, but having ourselves seen the plant in full bloom this season, we are enabled to form a correct estimate of its real value. In habit it differs in nothing from the old and well-known form of Canterbury Bell, but whilst the blooms are equally large, both the white and blue, the calyx, in addition, is much

enlarged, and changed from its ordinary green form to the same colour as that of the corolla, thus adding considerably to its effectiveness as a border plant. Too much cannot be said in its praise, and we strongly recommend this new form of our old favourite flower to the readers of this Magazine. The fact of its coming true from seed renders it everybody's plant, placing it within the reach of all lovers of their garden.

A CALIFORNIA LAWN SPRINKLER.

WE have recently received from a friend in San Francisco an automatic sprinkler such as is much in use there, where it is necessary to produce an artificial rain to keep lawns green in summer. It is shewn in fig. 1.

A light tripod, about three feet high, sup-

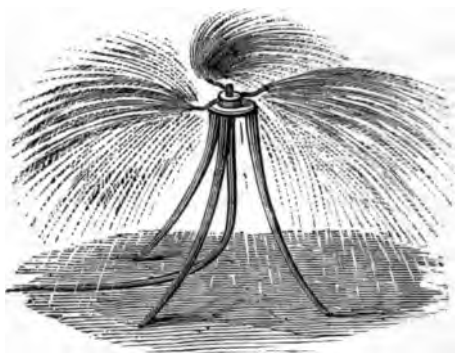


Fig. 1.—California Lawn-sprinkler.

ports a revolving head, which consists of three armlike tubes (shewn in fig. 2) attached to a central hub that plays around the tube. The tubes are attached in such a manner that they can be swung outwards, and water is forced out of the ends of the tubes as it flows through them, thus creating a fine misting

fine spray over a circle of from 10 feet to 30 feet in diameter, according to the pressure of the water. We are using ours with a head of about 15 feet, and it covers a diameter of 20 feet. When this area has been well

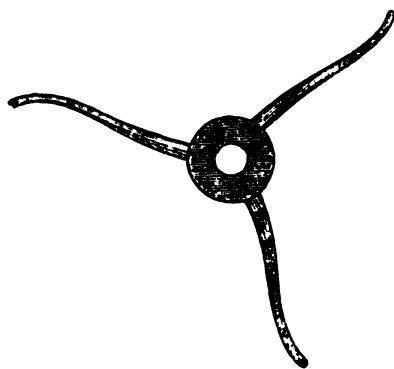


Fig. 2.—Tubes of Sprinkler.

watered, the machine is moved to new ground. It requires but little attention from a man working in its neighbourhood, and is a very useful affair in dry weather. We are not aware that they are for sale in this country, but any ingenious plumber could make one (mainly of gas pipe) without much expense.

The Veterinarian.

VENTION OF ABORTION, &c., IN MARES, COWS, AND EWES.

CESS in this department will be en- formed, to the exclusion of a dangerous
red only after careful study and re- plethora and impure blood supply, which is
n of the causes, combined with ex- inevitable under prolonged inactivity and
are to avoid or arrest their operation. allowances of rich food. The practice of
een shewn that certain effects upon bleeding, which has been frequently recom-
vous system are productive of evil mended as a preventive of a plethoric state
and likewise the tendency that exists and its result—abortion, is entirely uncalled
ame, to arise from plethora, caused by for, when proper exercise is enforced, and
d and want of proper exercise, acute principles of diet are closely observed.

ion, and its train of awkward features, In the selection of food, particularly as the
a, blood poisoning, infliction under approaching time of parturition renders the
nd restraint, accidents, frights, &c., animal less capable of bearing fatigue, the
emains but to point out the necessity exercise of much care and thought is required.
exercise of great care and due surveil- It must not be too rich, or if very nutritious,
lver all pregnant animals to obtain it should be combined with other kinds, good
ful breeding. and sweet, that are more bulky and less nu-
tritious. A proper state of the bowels must
be ensured, and this is readily effected by
careful dieting as proposed. Bran, with hay
and straw chaff, answers admirably to reduce
the heating qualities of corn, while grass,
clover, and the roots, suitably appear at their
appropriate seasons for similar use. Thus
diarrhoea and constipation, opposite and
dangerous states, in pregnant animals, may
be avoided, and a most healthy condition
and bodily vigour maintained without re-
sorting to injurious medicines for the
purpose.

ur as the question of food is con- In order to escape the attacks of ergotism,
the greatest importance is attached a careful selection of pastures must be made.
by judicious selection, proper admix- In wet seasons, those which have been badly
th attention to supply and regularity, grazed during the summer must be scrupulously
ds of the whole category of causes are avoided, rather preferring those that have
way, the remainder being dealt with been mown late, in which the presence of
able principles of housing, exercise, seeding grasses is almost impossible. It ap-
ietness. It is unwise to place too pears that, as a rule, humid localities are most
regnant animals together, and equally liable to ergot in the ryegrass, and the seed
out one among a number of males. must necessarily be developed in late and
companions, with secluded pastures, wet seasons, to ensure all the conditions that
rable, and when the latter cannot be are essential for its formation. An immature
d, they may be distributed in pairs in
boxes, sheds, yards, or folds, &c.,
ut food is supplied. This is more
arly called for as pregnancy advances
completion.

cise is as indispensable as food, and
in breeding is derived, as much from
eficial influences as from any other
es that may be adopted. In proper
it promotes digestion, and renders
nutritious kinds of food available for
urposes during gestation, while all the
is of the body are more regularly per-

or imperfect growth takes place under the operation of surrounding influences, which favours the development of the diseased state within the seed. Pastures mown or grazed early and imperfectly, and allowed to rest up to wet seasons, are prolific sources of ergotized grass, but others well grazed up to the end of the dry season are safe. When difficulty occurs in providing safe pastures for changing pregnant stock, it is a certain precaution, first, to mow down the grass, so as to prevent a second crop being matured to seed. Land that is mown early, and forced by genial showers, is also apt to possess ergotized grass later in the year, and we would advise the breeder to guard against the serious results by timely cutting down all seeding grass before the effects of the humid season are brought to bear upon the vegetation of his pastures. The power of ergotized grass is known to be such, that abortion will seize the pregnant members of the whole herds of cattle and other animals feeding upon it, and nothing less than attention to the system proposed will ensure entire freedom from its action.

The consequence of acute indigestion, such as impaction of the stomach or intestines, obstinate constipation, diarrhoea, dysentery, hoven, &c., giving rise to mechanical causes of abortion, are only to be avoided by a thorough observance of the rules of hygiene. Among sound and healthy animals, treated upon rational principles of dieting, such affections as colic, staggers, tympanitis, impaction of the stomach ought to occur very seldom, or we may confidently state, never; they are the offspring of some neglect or malpractice, and therefore, to avoid them, is to successfully prevent many causes of abortion. When pregnant mares return from hard work, especially when somewhat over-exerted, such as ploughing, or pulling heavy loads, being suddenly put to rest, and the food being changed, they are liable to become affected with colic, or other disorders of the stomach and bowels. To avoid this, the food should be gradually changed, and the work should be gradually discontinued. The harness should be carefully fitted, and the collar and withers, particularly, should be protected from irritation by the use of soft linings.

itchiness, and nothing soothes and satisfies the animal so much, as the pleasure of a roll on the ground, "heels in air," but, at the same time, no act proves so likely to endanger both foal and mother. If mere displacement occurs with rupture of attachments of the foetal membranes, the owner may escape with a loss of the foal only; but in numerous cases these results are accompanied by false presentation of the foetus, and during premature labour, in which the usual natural preparations are not made for delivery, the mother sustains irreparable damage, or delivery is impossible, from both of which she dies.

Although laxative medicines in judicious doses, and under certain circumstances, are admissible, and even called for, during pregnancy, it is desirable to limit the administration as far as possible to those of gentle nature. Undue purgation and saturation of the system with certain drugs prove highly obnoxious; rather follow plain and simple rules of diet, and allow food and exercise to effect their proper end, and the necessity for powerful medicines will be almost entirely removed. Purgatives, as adjuncts to bleeding, for the purpose of averting plethora, are to be discountenanced for the same reasons as already given in reference to bleeding.

Lastly, cleanliness is of vital importance. The effect of bad smells has no direct influence upon the uterus causing abortion, but by continuance, and in connexion with an amount of nervous excitement, great interference with digestion and the purity of the blood arises, and these lead to the disturbance in the vascular parts of the placental structures, which seldom fails to produce that end. It is therefore highly important that houses should be well ventilated and scrupulously clean, and pastures, folds, yards, and other places assigned to the breeding females of all animals, quite free from accumulations of putrefying animal and vegetable matter. The character of water also requires attention. The farm pond is not the proper receptacle for the drainage of stables, cow-houses, and yards containing live stock; nor should the filth

and human ordure from neighbouring closets, as we have seen in some instances, gain access to it. Such may appear very trivial things to name as causes, and we may be told that cows and other animals breed, and have bred successfully, although using such water, in defiance of the statement; moreover, it may also be said they prefer it before purer water. The selection can easily be ac-

counted for. Such water is considerably softened by the alkaline salts, which find their way into it, and the supernatant portion when removed may appear tolerably clear; yet it does not alter the nature of the fact that it contains certain elements which are productive of evil consequences.—*G. Armatage in Highland and Agricultural Society's Transactions.*

HORSES' FEET.

ONE of the most common errors of the present day, and to which much importance is attached by all who have to do with horses, is the belief that the major part of those whose feet are so called "bad" have inherited the failing at their birth. We therefore hear the smith complaining of this animal having "shocking feet;" others are said to be "pretty fair," or "tolerably good," and very few are really "first-rate." Some are "too hard," and therefore he cannot exercise his ingenious designs in carving and scraping them as he would like, and another kind are so "thin and shelly" that they will not hold a shoe, and by the pressure of the nails lameness results, or pieces are split off time after time, until the animal is quite useless.

If any person will take the trouble to make notes and close observation, he will find that all the different kinds of feet which are recognized in the category of the shoeing smith of the present day, who is impressed with the prevailing madness for hoof mutilation, invariably come in for the same kind of treatment. If nicety of description, and powers of discrimination are his in the way of deciding on the different kinds, they have so far failed in making apparent to his obtuse intellect, that treatment should be consonant with Nature's requirements. And this is not all. We have found times innumerable that, let the horse's foot be ever so good in his own esti-

mation when it first comes beneath his care scarcely twelve months go by before we are told that our steed has some defect of the feet—it has become "thin and brittle," "hard and crapply," "weak and shelly," and some have gone so far as to say "he has naturally a bad foot"—actually asseverating that he was foaled with the defect. Had we not witnessed the gradual destruction occasioned by reduction of the hoof by knife and rasp, and had known nothing of the disastrous effects of alternate heat and cold, and drought and moisture upon such an important structure, thus deprived of its own means of preservation, we might have believed such statements. Knowing differently, we condemned the men for their ignorance and mendacity, and for the future scrupulously avoided them, except at the end of a year or so more when we call to exhibit to them the same horse with sound strong and perfect hoofs, the result of different treatment altogether.

Without entering into minute details of anatomical structure and design, we would desire to carry the reader with us in a brief description of the component parts of the hoof, and the functions they fulfil, by which it may be ascertained how much the foot can take care of itself, if man's stupidity and ignorance is allowed no part in its treatment.

The outer case—called the crust or wall—grows downwards from the top or coronet, where it is formed, and is composed of a

series of fibres or tubes, firmly attached to each other by an intervening texture of horn. The ends of these tubes are always presented to the ground, and thus are enabled to resist wear much longer than if their sides were placed in that position. The direction of the fibres at the toe is remarkable also : it is oblique or downwards and forwards, and thus the foot acts as a wedge on the ground, which is most usefully taken advantage of during rapid movement and sudden stoppages. Other peculiarities consist in exceeding toughness and firmness, giving due protection to exquisitely sensitive structures within, and these are mainly due to a secretion thrown over the outer surface from the coronet, which makes the hoof waterproof, and enables it to resist the action of sharp stones and even sharper knives. This enamel is carefully rasped away by the farrier at every shoeing, because he is not acquainted with its origin and purpose. The hoof, then, readily imbibes moisture and swells, by which nails are disturbed and shoes loosened; and when subsequently dried, it contracts, and with the action of the feet with the loose nails and shoes, pieces are split off and shoes lost.

The lower or ground surface of the hoof called the sole, is secreted from a substance within, called, in contra-distinction, the sensitive sole, but is formed in flakes or layers, and these from time to time desquamate or fall off. No such property belongs to the crust. This mode of reproduction in the sole is eminently favourable to strength and protection from stones, and so preserved, the hoof never becomes dry and shrivelled, but is firm, usefully hard and sufficiently resilient. The farrier cuts out all this at each shoeing, thus renders it weak, and

bones within, disturbing the circulation and setting up disease, and the animal soon "knuckles over," and "goes stilty or groggy." In its natural state the sole will bear great pressure without injury, but when pared as we describe, none can be borne, and corns as well as other internal diseases are the inevitable result. It never should be pared, as its own powers of exfoliation and maintenance are essential for every necessity.

At the back of the foot, occupying a triangular space in the sole, is the frog or cushion. This is tough and flexible, and is intended to meet the ground before any other part of the foot. Many farriers do not believe this, because they are not able to prove the fact, and, moreover, not knowing strictly what else the frog can be intended for, diligently pare it away with the sole. It is thus removed from proper function, dries up, and becomes diseased, and the state called "running thrush" is produced, for which a remedy has to be paid for. The only part of the hoof that requires reduction by the knife is the lower or ground surface of the wall. The sole and frog require no further attention than to remove such portions as are loose and ragged. If any system of paring is practised, the end is, as we have stated, destruction of the hoof and origin of internal disease; and, we all know that, in our large towns where these results are so common from the repetition of such uncalled for vices at every shoeing, the necessity for "leather soles and stopping" is occasioned. These are the farrier's plasters which he applies as remedies for defects his own false practices and unpardonable ignorance have occasioned, and which occupy a conspicuous position in the account, often so much to the profit of unscrupulous grooms and coachmen who always believe in their utility. Owners of horses will, however, learn better bye-and-

HORSE-SHOEING.

IMPRESSIONS THE FORERUNNERS OF FALSE PRACTICES.

will be apparent to all who look upon the horse as a weight-bearing animal, when only his own body is taken into consideration, that his hoofs should possess strength, soundness, and hardness, in order to give the necessary support and protection.

But, however, we add to his duties of carrying those of drawing, sometimes heavy loads, and at a rapid rate, over hard and macadamized roads, to say nothing of bad roads, and those still worse roads—covered with huge angular masses, is termed “repairing”—we have furnished evidences of the necessity for a complete aptitude and preservation.

On hard roads, bad roads, and rapid travelling have not done all the mischief to horses’ feet, of which we have at this time to complain, and for which so many are now to announce a remedy in some well-known “patent” or other. So-called scientific applications, both as patents and otherwise, as well as brutal ignorance, have had an equal share in the spoliation, and the cry is as ever for remedies to overcome the present state of things.

Illustrative teachers are fond of illustrating, and such men have originated and propagated much error by resorting to them for a solution of difficult questions. Thus they have said the hoof corresponds to the human nail, in the process of growth is liable to assume an improper form; therefore, it must be pared. The human nails likewise being

that may attract attention, are said to be carefully trimmed from time to time, in order to preserve the desired shape, and horses’ feet have not been forgotten in similar directions. But while these modes of paring, trimming, and rasping

have been going on, those who taught and those who practised entirely overlooked the fact that the human nails are not intended to bear weight, resist momentous shocks, and sustain such forces that would cause complete disruption of their several parts as the hoof of the horse is required to do. The human nail in the absence of exercise will grow inordinately long, which a simple abscission may remedy; but combination of parts endowed with special and dissimilar functions, as they exist in the horse’s foot, require something more than the bare direction that “it must be pared.” Vague teaching as this is has led to an immense amount of error and, as is always the case, when carried over a series of years, the result proves almost insurmountable. The present state of our horses’ feet, and ignorance displayed in what is termed “horse-shoeing,” are now as bad as they can be, and our agricultural societies would do well to look into the matter with a view of amelioration.

Many years ago horses were not shod as now, and in many countries at this day merely sandals of rushes or some rude material are employed as a protection. The Romans used their horses *barefoot* upon the hardest of roads, and it was only after extended rapid invasions into countries in which their system of road making could not be or was not introduced, that serious conditions of the feet became common. The horse being a most valuable animal in the Roman’s estimation, he sought the best skill for his preservation, and veterinarians under Constantine were appointed to watch over the horses of Byzantium. These men possessed the rank of nobles, and for successive generations sat at their chieftain’s table and enjoyed his confidence. Their practice was confined to the ailments of the feet—not so much in the way of cure as in the way of prevention, for, where damage from attrition or fracture

was observed, then foot shackles—*ippopedes*—were used, and being bound over the fetlocks and pasterns by thongs, considerable inconvenience was caused thereby. Later the sandals were plated with iron beneath, and even on state occasions, profuse ornamentation was resorted to.

After the lapse of a few centuries, skilled artificers acquired the art of repairing breaches in the hoof by letting in pieces of iron over the seat of fracture only, and this led, subsequently, to the application of a defence to the whole of the foot, which became a common practice, in order, as we have already said, to *prevent* damage to the hoof. Meanwhile, every endeavour was made to preserve hard and firm hoofs, which qualities were held to be highly indispensable to every horse. There were no rasps, chopping knives, and buttresses, as now, to mutilate and reduce the hoof, but *only as much of the outer edge and toe was taken off as was necessary for the preservation of a proper length and form.*

At length the use of a shoe became general, and the form was that of a flat plate of iron, in outer circumference corresponding to the contour of the hoof, and when nailed on, received pressure from all parts of the foot alike, in fact, as so shod, it was subject to the same general pressure as if it had been shoeless. This practice being continued for some time, it was observed that the hoofs, no longer subject to the wear of the roads, grew inordinately long, and lameness resulted. The previous practice of trimming the hoof would not now answer, and in reducing such large growths, the *ferrier*, or farrier, as we now call the shoeing-smith, was as likely to run into the wrong direction as the right. That knowledge of form and function was not then what it is now, and the result was a series of experiments, some of which were successful, and some not.

It was found that the hoof, when shod, was not only longer, but also heavier, and that the weight of the shoe, and the pressure of the road, were not only not beneficial, but also injurious. It was also found that the hoof, when shod, was not only longer, but also heavier, and that the weight of the shoe, and the pressure of the road, were not only not beneficial, but also injurious. It was also found that the hoof, when shod, was not only longer, but also heavier, and that the weight of the shoe, and the pressure of the road, were not only not beneficial, but also injurious.

over-growth, the veterinarians observed that the hoof gave evidences of elasticity. When placed on the ground and the animal's weight was gradually imposed by taking up the opposite foot, considerable descent of the frog and spreading of the heels were noticed, and from that moment there burst upon the world a flood of information concerning alternate expansion and contraction, which has ruined more horses through their feet than any one not conversant with the facts would be inclined to suppose. The results of imperfect observation, made at a time when the hoof was reduced to an abnormal condition, because made by men who stood "high" at the time, were accepted as verity and swallowed without hesitation by owner as well as the groom and smith; and to this day we hear in the shoeing forge of veterinarians, who ought to know better, and within a very recent period we heard from the lips of a professor at a veterinary school so much twaddle about alternate expansion and contraction, that we have no need to look for any other cause for bad shoeing and hoof mutilation, nor in any other establishments than in those where the absurd dogma is treasured and taught. In the natural hoof, preserved as Nature originally designed it, all parts are capable of receiving pressure, and neither expansion, contraction, or descent is apparent. Such phenomena are unnatural to the hoof, and as hurtful, as they may well be, for who but a false observer would suppose that motion, without hurtful friction or even rupture, could possibly be tolerated between sensible and insensible structures, particularly when each are so closely attached to *prevent* motion. In all parts where movement or separation of parts is required, special provision is made, and lubricating organs are called into action; but in those parts of the foot where the advocates of the expansion and contraction theory locate their fancied motions no such provision is apparent; but we find as a result of the infliction by knife, rasp, and other instruments, every disease to which the foot can be liable. The hoof is sacrificed, its functions are perverted, and the horse in the end totally ruined.

The Dairy and Poultry-Yard.

THE ADULTERATION OF MILK.

the first general meeting of the Manchester Farmers' Club, the following report on the adulteration of milk, composed by Dr Leach, of the Manchester and Sanitary Association, was read:—

A large portion of the milk supplied to the districts of Manchester and Salford is adulterated, but this adulteration consists of the addition of water, and not, as is popularly supposed, of the introduction of such substances as chalk, starch, and brains. In the course of an examination of a large number of specimens purchased in this city and examined by a foreign ingredient found. In this common salt was present in considerable quantity, but as the milk from the dealer did not afterwards contain it, its purity was possibly accidental. Besides adding water, however, the vendors often deteriorate the milk which they are abstracting the cream. For all the purposes it is found that the purity of milk may be determined by ascertaining the percentage of cream and solid matter which it gives. It has been found that good milk gives 10 per cent. of cream, and is not less than 12 per cent. of solid matter.

A milk having sensibly less percentage of cream and solid matter than this is either skimmed, or watered, or both. A chemical analysis is requisite to estimate the percentage of solids present, though readily effected in a laboratory, cannot be undertaken in an ordinary household, and a more yet fairly reliable test is therefore required. An instrument called the lactometer has long been used for estimating the purity of milk by means of its specific gravity. The results obtained are not very reliable—firstly, because instruments bought at different places do not give the same indications to purity; and, secondly, because

an excess or deficiency of cream may alter the results which the lactometer gives. A rich milk if it contains a very large percentage of cream may appear from the lactometer to have been adulterated, whilst a milk which has been deprived of cream may appear from the lactometer to be good, even though in addition to abstracting cream some water has been added. The specific gravity of cream varies much—the average, however, is about 1.050, that of water being taken at 1.000. Therefore, the presence of cream or the addition of water will produce similar results as far as specific gravity is concerned. If a cream measurer be used in addition to a lactometer, the chances of a correct result being obtained are markedly increased; if a large quantity of cream be present a somewhat lower specific gravity will be looked for, and *vice versa*.

It is not very easy, in any case, to calculate to what extent the specific gravity ought to be affected from the amount of cream contained—the effects of the removal of cream do not seem quite uniform in different milks. The best plan seems to be first to ascertain the quantity of cream present by means of a cream measurer, and then to take the specific gravity of the milk after the cream has been removed. By adopting this plan a test is obtained sufficiently accurate for the ordinary purposes of seller and buyer, enabling the former to judge whether he is distributing poor or adulterated milk, whilst the latter can tell whether he is receiving that for which he pays. If milk yields not less than 10 per cent. of cream, and when this is removed has a specific gravity of not less than 1.031, it is good, though the milk from some cows gives more cream and has higher specific gravity. The best milk tested gave 15 per cent. of cream, and had a specific gravity

results obtained. The quantity of cream rising to the surface of milk in narrow vessels varies much according to the temperature, and somewhat, also, according to the amount of shaking to which it has been exposed. If kept continually above 60 deg. to 65 deg. unadulterated milk may not give 10 per cent. of cream. The following experiment shews how temperature affects the yield of cream:—Four cream measures were filled with the same milk, which was known to be unadulterated. One was kept at about 40 deg., one at about 60 deg., and a third between 65 deg. and 70 deg., and a fourth a little above 80 deg. The temperatures were maintained about twelve hours. At the end of that time No. 1 gave 11½ per cent. of cream; No. 2 gave 10 per cent. of cream; No. 3 gave 7 per cent. of cream; and No. 4 gave 4 per cent. of cream. In ascertaining the amount of cream present in a milk, therefore, care must be taken that the cream measurer be kept in a cool place. In hot weather it is best to let the milk stand during the night for this. In the height of summer, if the night temperature does not fall below 65 to 70, a good milk may not shew more than 7 per cent.; but if the thermometer sink for a portion of the time to 60 deg., to 63 deg., 10 per cent. of cream will be obtained from milk of average goodness. Should the cream measurer and contents be left all night in a hot kitchen, it might happen that the ordinary amount of cream would not rise to the surface even of good milk. Milk carried through the streets or otherwise much shaken gives somewhat less cream than the same milk not so treated. In specimens of milk of known purity, taken before the round and after it, there was a difference of from 1 to 2 per cent. in the cream yielded. This may partly arise, however, from the mode of distribution. The cream in the cans is continually rising to the surface, and, as the milk is usually ladled, hence the first part of the milk distributed will contain somewhat more cream than the latter somewhat less cream than is natural. This is the more likely to be the case in milk that has been adulterated with water, since cream rises quicker in watered than in pure milk. No means can be de-

ised of ascertaining whether water has been added to the milk, except by the results produced in the character of the milk. Thus, a little water might be added to very rich milk, and yet it might afterwards give 10 per cent. of cream, and have a specific gravity after skimming of above 10.30. But it is quite sufficient to show that a milk contains a proper quantity of nutrient material, and this is indicated by a yield of 10 per cent. of cream and a specific gravity of 10.31. Apart from the character of the cattle, in some cases, however, an unadulterated milk may give less than 10 per cent. of cream. It is customary in many farms round Manchester to save the strippings for butter, and send the rest to be sold as new milk. Now strippings contain more cream than the other milk, in some cases yielding from 15 to 24 per cent., and hence milk from which the

strippings have been withheld may not give above 5 per cent. of cream, even though pure and unadulterated. In whatever way, however, the milk is deteriorated, whether by adulteration with water, by the addition of skim milk, or by a careless method of distribution, the result is the same as far as the consumer is concerned. The lactometer and cream measures, used in the way suggested, will sufficiently indicate the character of the milk for ordinary purposes; it will enable any one to ascertain readily whether or not he is receiving good and pure milk. In the experiments made by the committee of the Manchester and Salford Sanitary Association the results of analyses have always pointed to the same conclusions as those obtained by the lactometer and cream measurer, yet, when accuracy is required, as for legal purposes, the latter test should be preferred.

THE CONDENSATION OF MILK.

THE haphazard and unjust remarks made by Dr Smith on the condensation of milk, in his lecture before the British Association recently, were, it is satisfactory to know, met with the return they merited. Dr Smith, it will be remembered, not only accused the preserved milk companies of endeavouring to sell their product at a price much greater than the same quantity of milk could be bought at, but gave it as his opinion that skimmed milk was used by most of the manufacturers of the condensed fluid—an assertion which it turned out was both unfounded and unjustifiable. If philosophers, in their no doubt laudable endeavours to expose any fraud which may lurk under the surface of seeming excellence, lose sight of veracity and fair play, it is feared they will bring themselves into disrepute. We find a very impartial sketch of the system of the Aylesbury Condensed Milk Company in the *Grocer*, which will be interesting to reproduce. It will

be seen that the company and the farmers work well together.

The English Condensed Milk Company, says our contemporary, has now been in existence about two years, the factory at Aylesbury having been in working operation during that period. The manager of the company—Mr Merriam—was formerly connected with the Anglo-Swiss Company, and was, indeed, the first to introduce and popularize *lait condensé* amongst the British public. The establishment of condensed milk factories in this country was unquestionably a great agricultural innovation. Farmers could only regard it in the light of a *bouleversement*, but still one which was decidedly beneficial to their interests. In the neighbourhood of Aylesbury the bucolic mind was sufficiently enlightened to perceive that the offers of the agents of this Company to take their milk off their hands at a certain price was an advantageous one, and accordingly they accep

it with gratifying unanimity. The co-operation of the farmers was, of course, an essential condition of the success of the undertaking; and it was, therefore, satisfactory that the Company suffered no inconvenience in this respect. Having in regard, moreover, the fact that they offer to the farmer for his milk terms which he cannot in his own interest refuse, it is by no means surprising that no difficulty was experienced of this kind; and at the present time the local farmers are only too pleased to dispose of their milk to the Company. By doing so they avoid many exigencies and liabilities to loss which heretofore attended their labours; and, under the present *régime* of sending their milk to the factory, they have little other anxiety than the pleasurable one of receiving their cheque for their produce, which cheque the Company, with commendable regularity, present weekly.

It is interesting to mention, *en passant*, that the Company have erected a factory in Cheshire (at Middlewich) for the conservation of milk; thus, in a sense, actually taking by storm a notoriously cheese-making county. This factory is expected to commence operations very shortly, under the management of an experienced superintendent; and so far, we believe, the farmers regard the enterprise with feelings of decided favour. Already there is a cheese factory established in Cheshire, and when to this is added a condensed milk factory, who shall dare to say that Cousin Jonathan is not invading us; that American principles of doing business—especially in the matter of dairy produce—are not in the ascendant in this country? Seriously, however, it is a gratifying circumstance that the success of this Company is a

continuous and increasing one. The establishment is a most successful one, and the business is a most important one. The Company are just without the town, and are pleasantly

and conveniently situated. The buildings being all new, they present an interesting appearance, and the passer-by cannot fail to be struck with them. There is a sense of busy activity about the place which bespeaks at once the activity of manufacture. The farmers bring the milk to the factory early in the morning—chiefly between eight and nine—and the daily amount of milk used at the present time varies from 3000 to 4000 gallons—certainly a very large quantity.

The delivery of the milk necessarily occupies some considerable time, and is certainly an interesting process in itself. The farmers send it in the large tin cans ordinarily used in the trade, which the Company supply, and immediately the milk is received it is emptied into a large trough—not, however, before it has been critically examined and tested by men employed for that purpose, and who are enabled to detect the slightest impurity. From this trough—which receives the milk through a sieve for the purpose—it is put into a large tank, being placed in metal cylinders, where it undergoes what may be termed a sort of hot-bath. After remaining here for some time it is emptied, by means of cranes, into large funnel-shaped vats, and is thence drawn up, through a pipe in the centre, to the vacuum or condensing pan, which is on the higher floor. In order to effect the process of condensation, the milk remains in this pan for some time—say two or three hours—during which the evaporation of the water occurs. This part of the process having been satisfactorily completed, and the milk having assumed in some measure its condensed form and consistence, it is conveyed into the lower room again, where it is placed in suitable manner for the purpose of cooling. It must be understood, too, that the temperature during these processes is regulated with the utmost precision, and, when they are entirely completed, the milk now in its condensed form—is taken to the filling-room, where it is run into 1 lb. tins, the sizes ordinarily sold. The tins are then soldered up, the labels are affixed, and, practically speaking, the article is ready

or sale to the public. The tins are packed into cases containing four dozen each, which are appropriately marked with the brand and name of the Company. Great care is invariably exercised that no tins should leave the works unless they are perfectly air-tight, and, in fact, none are sent out without every possible precaution being taken to avoid the least defect in any respect. To this carefulness in producing an article of the best quality, the popularity of the goods of this Company is doubtless attributable.

In all matters connected with the manipulation of milk—either in regard to cheese or butter making—an imperative condition is that perfect cleanliness should be observed in the arrangements; and this remark applies equally to the preservation of milk. The English Condensed Milk Company are thoroughly appreciative of this fact, and they carry out their appreciation to the utmost possible extent. They are determined not only to have pure milk, but also that not the least vestige of adventitious impurity should catch it in the process of manufacture. Thus, in all the arrangements of their works this great characteristic—perfect cleanliness—is everywhere noticeable. When the milk is first received from the farmers' carts, it is inspected with the utmost vigilance, and we believe that even the premises of the farmers are often visited, with the view to see that they are in proper condition as regards the keeping of the milk. The tins, too, in which it is conveyed to the factory are models of cleanliness. When they are emptied at the works in the morning, they are thoroughly washed with hot water, which is dashed into every corner and crevice, thus avoiding the possibility of any description of dirt adhering to them. The factory itself, too, is beautifully clean, and offers a very good example to many farmers whose dairies are by no means so perfect in this respect as could be wished.

Altogether the Company employ at Aylesbury about 200 hands, all "native and to the manner born," and it will thus be perceived that the establishment of this factory

has created quite a new industry in the neighbourhood. It is consequently regarded with the greatest favour by the local inhabitants, who believe in preserved milk most thoroughly—a strong proof of its intrinsic good qualities. The workpeople themselves also use it largely, which affords convincing testimony—if that be necessary—of the purity of the milk itself. The local grocers do a good trade in the article, and it is said that the *lait conservé* is used in large quantities in the district preferably to milk direct from the cow. If this be the case in a rural locality celebrated for its dairy produce, &c., how much more extensively ought the condensed milk to be consumed in large towns and cities, where the obtainment of milk in its perfectly pure condition is the next thing to an utter impossibility—especially under the existing *regime* of "Simpson" and the "cow with the iron tail."

As regards the constituents of the milk, the following is the *Lancet* analysis:—

| | |
|------------------|-------|
| Moisture | 25.10 |
| Fat | 11.73 |
| Casein | 15.17 |
| Milk sugar | 16.24 |
| Cane Sugar | 29.46 |
| Ash | 2.30 |

100

This analysis shows the milk from which the extract was obtained to have been decidedly superior to the average milk sold in large towns.

In conclusion, we have pleasure in stating that a visit to this factory is most interesting, not only in consequence of the character of the product it turns out, but from the perfectness of all the processes in operation and the apparatus employed. As a new industrial development, too, it is worthy of notice; and it is to be desired that such scientific gentlemen as Dr Smith would, before they pronounce judgment upon an article of which they know little, take the trouble to inspect the mode in which it is produced, which would considerably enlarge their acquaintance with the subject they desire to treat.

IMPROVEMENT IN CHEESE-MAKING.

AT the dinner of the Over Agricultural Society last week, Mr Joseph Aston, himself a very successful dairy farmer, gave some good advice anent cheese-making. Some persons could never make fine cheese, and after struggling on for years at last gave up the occupation and turned to some more remunerative employment. But although cheese-makers might have difficulties to contend with, he considered that if the observations he was about to make were attended to, the results would be satisfactory. First, the cattle should be fed well; secondly, the milk should be put in airy places during hot weather, and be free at all times from unpleasant smell; thirdly, the vessels should be sweet and clean; fourthly, the rennet should be applied to the milk at the proper temperature, according to the state of the weather and the condition of the milk; fifthly, the curd should be handled in a careful and skilful manner; lastly, the proper quantity of salt should be applied; and if, after complying with these conditions, any one failed to make good cheese, rest assured there was something wrong somewhere, and they should not rest satisfied till the cause had been found out. Salt was of little or no use unless the state of the curd was duly considered and thoroughly understood at the time it was applied. Cheese was either under or over cured, which greatly lessened its value, in some instances as much as 30s. per cwt. While it was well to guard against extremes, it was better, in his opinion, to over-salt the curd than to under-salt it. He was much inclined to think that a great deal of the success of the Americans in cheese-making was due to the fact that they had a great deal of experience in the matter, and that they were not so much influenced by the theories of the English when they began to make cheese. He had seen the English cheese-makers, and he had seen the Americans, and he had seen the difference between them. The English cheese-makers were slow and cautious, and they were not so much influenced by the theories of the English when they began to make cheese. The Americans, on the other hand, were rapid and confident, and they were not so much influenced by the theories of the English when they began to make cheese. He had seen the English cheese-makers, and he had seen the Americans, and he had seen the difference between them. The English cheese-makers were slow and cautious, and they were not so much influenced by the theories of the English when they began to make cheese. The Americans, on the other hand, were rapid and confident, and they were not so much influenced by the theories of the English when they began to make cheese. He had seen the English cheese-makers, and he had seen the Americans, and he had seen the difference between them. The English cheese-makers were slow and cautious, and they were not so much influenced by the theories of the English when they began to make cheese. The Americans, on the other hand, were rapid and confident, and they were not so much influenced by the theories of the English when they began to make cheese.

1 Show, and Balmer being unsuccessful, at the County Show Balmer took prize and Prescott second, and he Aston) was first in the Local Show. rporley, however, one who had been cessful up to that time came forward eat both Balmer and himself. One or asons might be assigned for these apt discrepancies. The judges at Chester ubt differed from those at Bolton, as at constituted a first-class dairy, for a ption of cheese held in high estimation Manchester markets and the north of nd, was not so highly appreciated in on and the western counties of England. ier, perhaps more substantial, reason hat the cheese varied exceedingly in

value; even those of the same dairy, varying from 5s. to 10s. per cwt. No doubt the cheeses which Mr Balmer exhibited at Bolton were not so good as those which he shewed at Chester, for at his own request he: (Mr Aston) cut some in each lot in the show-yard; and in his opinion those exhibited at the county show were worth at least 5s. per cwt. more than those which were exhibited in the local society. A wish had been expressed in a local paper that the merits of the factories should be discussed, but all he would say on that was that they should publish their results, so that those farmers not now making fine dairies could determine whether they could do better by sending their milk to the factories.

POULTRY AND PROFIT.

WE have read with much interest a popular little book, entitled "Eggs poultry as a Source of Wealth." There are some good things in it, but we should have preferred to see it more carefully edited than it is with reference to the figures. The introduction shews that the author has not been well up in his statistics, for, perhaps, that he has been underestimating the value of eggs. We are told that the money we pay for eggs annually "is nearly a million sterling." The Board of Trade returns up to the end of August tell us that the amount we disbursed this year in eight months was £1,377,953, in round figures at the rate of one million and three pence per annum.

The fact that our author understated his estimate with reference to the value of the eggs exported, gives his position greater strength, in recommending to the British public the desirability and the profitableness of directing more attention to poultry than they have yet done. Speaking of eggs, he does not very gracefully but pertinently say:— "as this is, an article which we have

the same facilities for finding at home as our neighbours have, the question may be asked, Why need we depend upon a foreign country for the supply? With articles that we cannot produce at home, on account of unsuitable climate, &c., such as coffee, tea, sugar, spices, and wines, we can readily comprehend the necessity for resorting to foreign countries for supplies. But this is not the case with eggs, &c.," and so on. The writer goes, not exactly telling us why we are excelled by our neighbours, but giving good advice in the matter of rearing.

The numbers of hens in this country in home steadings are by no means so many as they ought to be. Poultry, as a branch of husbandry, has been sadly neglected among us. In every farmyard there is wasted grain, when domestic fowls are not there to pick it up. We are quite aware that farmers, as a rule, do not care very much about them, particularly those who are fond of fancy gardens. Only a few farmers' wives are disposed to give any time to look after them. A little care, however—for hens are tractable—a little attention daily for a short time would

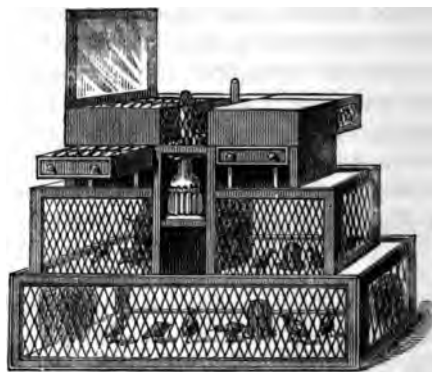
insure their being kept out of the flower beds and out of the fields of corn. "As the old cock crows, the young one learns," it is said, and we believe it, in a different sense from that in which the proverb is often construed literally. The young roosters and youthful layers, if judiciousness has been exercised in the up-bringing of the parental birds, will not intrude upon ground held sacred by "the ancient parties." They will not trespass upon the gardens nor pick the growing ears of corn. Like a cat (it being presumed that they are always well fed) taught to keep its paws off the pet cage-bird, they will keep their scraping feet from the garden and their beaks from the cereals.

Having regard to the high price of meat, therefore, we think with this author that poultry production on a much larger, or on a more diffusive scale in this country would save much money to the consumers and be profitable to the rearers.

The author has a chapter on artificial hatching as a means to increase the number and value of fowls, from which we extract

which the chicks when hatched are placed to receive the heat necessary for their health. The boxes are covered with a lamb-skin, or a "Wool-Mother," against which the chickens nestle their backs, while the cool gravelled flooring affords for their feet a surface similar to that which they would have, had they been naturally hatched. It is calculated that if proper attention be paid to the instructions, 70 per cent. at least of strong healthy birds may be hatched out.

The drawers of the Incubators should be strewn



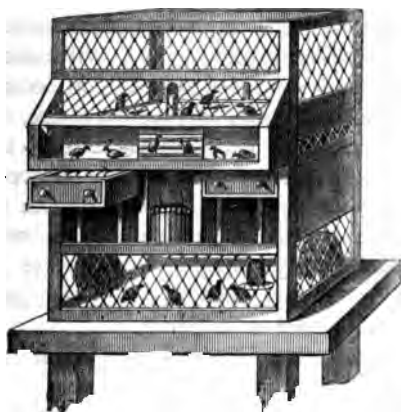
Thick's Machine complete, for 200 Eggs.

with bran or hay cut into small pieces, but never with sawdust, as the turpentine in the wood tends to destroy the germ in the egg.

We spread a quantity of hay upon the bottom of the drawers, so as to line them completely; and we place fifty hens' eggs in each drawer on the hay, and close the drawers. Heat is communicated from the water in the reservoir, the temperature of which must be about 120 deg. Fahr., in order to have the eggs at the required temperature of 102 deg. to 104 deg.

Twice every day the drawer is opened to turn the eggs, and they are then left exposed to the cooler air of the apartment for a quarter of an hour before being replaced in the machine. When we add that the position of the eggs in the drawer may also be changed three or four times a day, we have given all necessary directions. After an incubation of twenty-one days, the chickens will break their way out of their shells. They are then left for four-and-twenty hours after they are hatched under the "Wool-Mothers," to dry and gain strength. During this time they are better without food, as the nourishment they have taken before breaking the shell is sufficient to serve them for that period.

The system of chicken-rearing we have described is admirable for the careful observation of natural laws upon which it is based. Nature has been imitated with the most perfect tact, and it is owing to the faithful imitation of her operations and conditions that success has been attained. The reservoir with its flannel covering represents the sitting hen, and the heat that proceeds from the reservoir is of the same



This is the machine for 100 eggs.

The machine is made of wood, and is covered with a lamb-skin, or a "Wool-Mother," against which the chickens nestle their backs, while the cool gravelled flooring affords for their feet a surface similar to that which they would have, had they been naturally hatched.

The machine is heated by a paraffin oil lamp—the temperature required for hatching being regularly maintained day and night.

Carrying pipes pass through the heated water, and carry warmed air to all parts of the hatching apparatus, and hot-water boxes form part of the reservoir under

re and almost of the same nature as that anates from the body of the parent bird.

on her nest warms her eggs from above, incubator is so constructed as to supply the the same direction. The hen turns her or twice a day, removing those that are in of the nest to the outside, and those that outside into the centre, so that an equable fused throughout. This operation on the e parent bird may easily be traced by mark- gs with pencil, and arranging them in a cer- before the sitting commences. In using ator, the same process of shifting and turn- tly observed. The hen quits her eggs once day, for a few minutes—about a quarter of in order to take the nourishment necessary life, and thus the eggs are allowed to cool xtent during the interval, the variation of re being considered favourable to the pro- ubation. In using the Incubator we take awer and expose the eggs to the air of the as imitating the natural process in every rticular.

ens are bad sitters, and if from any sudden hock is given to the eggs, the hope of may be considered as gone for ever ; but in f the Incubator, with its softly-lined drawers, re not injured, though the apparatus be kept shop in which the din of the hammer is con- ard.

egard to the economical advantage of using improved hatching apparatus, we have to hat is the cost of the grain consumed by a ing fifteen or sixteen eggs only, compared ost of the oil or gas required to maintain the re in an Incubator hatching 100 or 200 xperiment proves that the artificial heater it twopence every twenty-four hours, so that e of hatching the brood of from one to two under 4s. In summer, when the temper- e atmosphere is naturally high, the expense ably less. On the other hand, the brood

hen is not fed at a less expense than one penny *per diem*, and at this rate no more than thirty eggs are hatched naturally, at the outlay which, by using the Incubator, will ensure the hatching of two hundred. Besides this evident advantage, it is to be remem- bered that in artificial hatching the mother bird is free to continue laying uninterruptedly—thus paying its own way.

When the chickens are hatched, dried, and covered with down, at which condition they will arrive about two-and-twenty days after incubation they are placed under the "Artificial Mother." The water boxes being properly heated, are covered with lambskin, under which the chickens shelter and warm them- selves. In this *nursery* they are kept and fed for about a week ; they are then let out, but still kept near the nursery, the runs of which remain open so that they may enter when alarmed or when called to feed.

We do not hold out such Arabian Nights prospects about the value of fowls as some writers (and the one under review seems not quite averse to the same strain) have done. Their glowing pictures of wealth derived by some monster poultry feeders, whose hen-houses, by the way, can never be discovered by the keenest fowl-hunter, are calculated to prevent rather than promote the more extensive cultivation of poultry in this country. The actual state of matters not being quite so blooming as they are de- picted is apt to disgust the over sanguine, whose hopes have been so buoyed up. We are persuaded, however, that under ordinary careful management there is good profit to be made out of the sale of eggs and rearing of chickens.

The Apiarian.

TRANSPORTING BEES.

IN some favoured districts bees remain from the beginning of the year to the end of it. The trouble or expense of removing them to a locality supposed to be better, would not be covered by the additional income. In other localities the heather is at so great a distance that it is not considered worth while to remove bees so far for the chance of having a harvest of moorland honey. But earnest men, who keep large strong hives, find it profitable to remove them to good pasture. We remove ours twice every year, first to the clover, then to the heather; but our neighbourhood is a very poor one for honey. If left at home, our best hives would not gain 1 lb. of honey each daily in favourable weather during the months of June, July, and August, whereas on the clover and heather they gather from 2 lb. to 6 lb. each daily. When the bee-keepers of this country awake to see the value of large hives, in the vast stores of honey speedily gathered by them, the practice of removing bees to better honey districts will become as general here as in some Continental parts, where carts are made on purpose, shelf over shelf, to carry hives. In hot weather, inexperienced persons find some difficulty in removing full hives, the combs of which are so apt to fall down and melt by the heat. Great care is required in removing them, and the bees must be kept cool by the use of water. In some districts the bees are removed to the heather in the autumn, and the hives are left there until the spring. In some districts the bees are removed to the heather in the autumn, and the hives are left there until the spring. In some districts the bees are removed to the heather in the autumn, and the hives are left there until the spring.

in their first effort to transport their bees. In rainy seasons and cold winters, weak hives suffer most, but in being transported from place to place they suffer least. When suffocation takes place, it is almost always in one of the best hives.

In considering this subject, the value of cross sticks in each hive to support its combs will be seen: indeed they are indispensable, for if combs are not supported and kept steady by these cross-sticks they are easily shaken down. Sticks are otherwise of great advantage in hives, being used as by-lanes by bees in going from comb to comb.

There are various ways of saving bees from suffocation in removing them. The admission of plenty of fresh air into their hives is the secret of success. By admitting air enough, and confining the bees to their hives, we can safely transmit them by cart or waggon or rail, one hundred miles, or five hundred miles if need be.

Our mode of confining bees for removal from one place to another is as simple as it is safe. The doors of our hives are pretty large, and the holes in their crown are also large, some 4 or 5 inches in diameter. We nail a piece of fly-proof wire over their mouths and crown-holes, then tie the hives tightly to their boards with strong string or cord, and sometimes drive three 2-inch nails through the bottom rolls of the hives into the boards. They are thus prepared to bear rough handling. The fly-proof wire is nailed on the top secures ample ventilation for hives as full as they can be; and this ventilation is so great that the temperature of full hives is less at the end of a short journey than it was before they started. If hives are not full or crowded with bees, we do not often use the wire on

own holes. The wire at their doors, a few thin wedges or penny-pieces in between the hives and their doors before they are tied together tightly with string, prevents suffocation. They are safely. The nails are used to make them doubly secure. If hives travel over a road on a cart, the jolting sometimes causes them to move on their boards, especially if the bottom of the cart is not nailed. The nails, either through the rolls of boards, or outside of them, driven partly through the boards, prevent the hives from sliding laterally or off their boards. Of course, hives are thus prepared for travelling before the bees go to work in the field, or after the out-door labour of the season is closed. In this way not a bee is lost, and the cool of the day is the better for transport and transplant hives. If the weather be cold or rainy, the bees may be caught during the day, confined, and the hives tied and secured as described and transported. In fact, the colder the weather is, and the less the bees are at work when about to be transported and packed, the less danger there is, for in winter the bees need far less ventilation. We take our bees 20 miles to the other part of the way on carts, and the rest of the journey by railway, without having any losses and breakdowns. Indeed we can conceive a more efficient, safe, and simple mode of insuring the safety of hives being moved from place to place than the now described, and which we improve by practising.

without cross-sticks, such as bar-

frame hives, are exposed to great risk in being moved at all if they are not full of combs. Sometimes they are turned upside down while being transported, in order to prevent the weight of the combs helping to detach them from their holding points. Even in this position they will suffer much if slightly shaken or jolted. When the distance is short and the combs insecure, hives should be removed on hand barrows in their natural position.

When hives are so full that some of their bees are clustering outside, they should be enlarged with ekes or nadirs one or two days before they are prepared for removal to a distance. When such hives are to be removed but a short distance for the convenience of watching them swarm naturally, they can be safely carried on hand-barrows after ten o'clock at night, without closing their doors at all. Like well-behaved people, bees keep to their homes after that hour.

On arrival at their destination, all hives should be speedily placed where they are to stand, the wire on their crowns removed, and their own lids put on, then covered, and their doors opened. If the weather and time of day be favourable for honey-gathering when the bees arrive, they will begin to work in less than fifteen minutes after having been set at liberty, if they have not suffered during the journey. How quickly bees find honey-flowers and return with loads from them may be seen in placing hives in a strange locality on a fine day. If they have suffered from being over-heated, the bees will not go into full work for one or two days afterwards.—*A. Pettigrew's Handy Book on Bees.*

The Country Gentlewoman.

CONSERVATORY, FERNERY, STAIRCASE, AND DRAWING-ROOM DECORATIONS.

PERSONS of the most fastidious taste cannot fail to be gratified at the excellent examples of decoration presented to illustrate this article. There is an easiness and style about the whole that is thoroughly appreciable. Those not remarkable for

gratified at the style and finish of the whole ; the eye of the heedless is not offended, he may rail a little at the designs of Virgin Cork being placed to interpose between either his line of vision or intercept his passage along a straight line from one door to another, but



FIG. 1. A. VIRGIN CORK FERNERY.

...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...
...the ... of the ...

...about all he is likely to disclaim
...After all, there is something more
...than the mere possession of a plant ; there is
...something more than the mere keeping it
...alive—the mere growing it as well as it can

grown by the most accomplished horticulturist; there is the placing it in the right ration just as much as Horace's rendering of taste is indisputable, thus translated :—

A subtle fancy, and a judgment chaste,
Form the nice mixture of a genuine taste.

And so we have something more than the mere cultivation, the mere assortment of



Fig. 2.—Central Decoration for a Conservatory.

place, so as it will not only look well itself, but that it will even make its associates look



Fig. 3.—Fernery with Fountain.

better than they would if placed down in an indiscriminate way. That is true deco-



Fig. 4.—Staircase Fernery.

plants to consider ; we have to look upon them in the relation to which, not only the one stands with the other in the way of contrasting

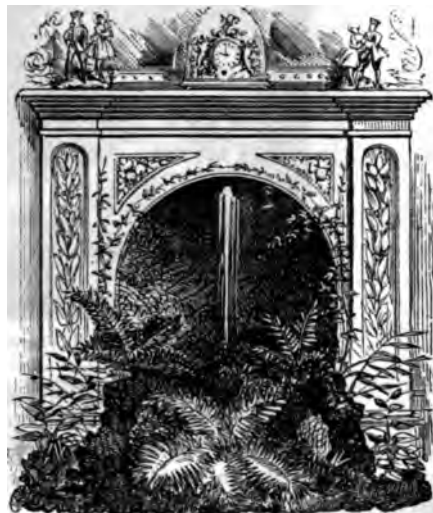


Fig. 5.—Summer Furnishing of Drawing-room Grate.

its varied features of habit, leaf, or inflorescence, or shading the one into the other with

the best grace possible, but we ought to study the relationship which the house itself—the horizon for the time being—and the material which serves as a home for the selected articles bear to one another. Until we have mastered that in a great deal better way than we have yet seen, we are only in the infancy of æsthetic gardening. It is because the

ing a central decoration for a conservatory or any large space where a suitable stand is required. The next (fig. 3) shews a Fernery, which is a source of amusement and a pleasant picture in any Conservatory, and from the little attention which Ferns require, they are always fresh, and after the first expense are the most economical to keep up. They

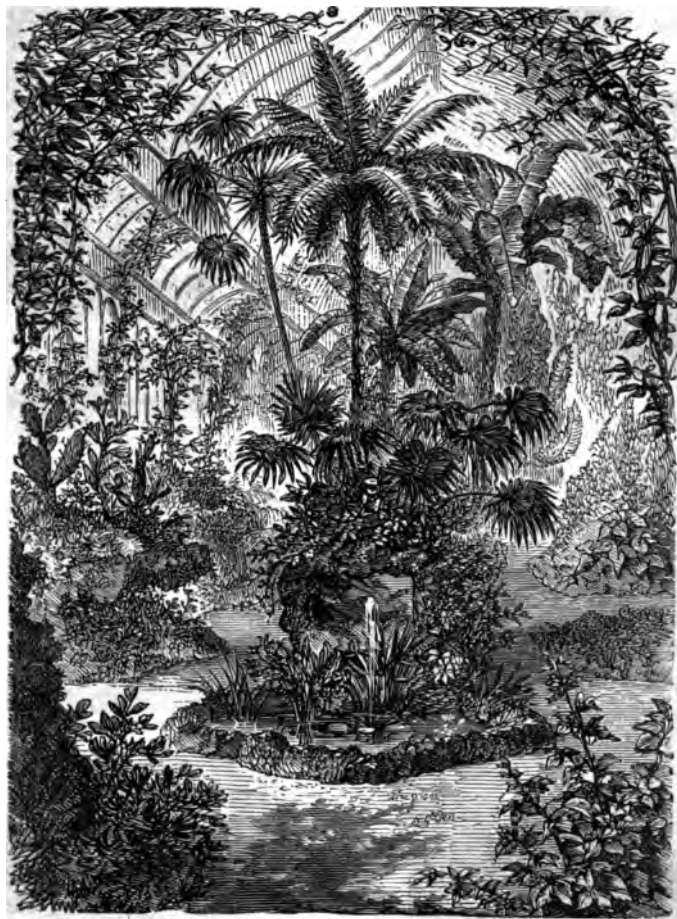


Fig. 6.—Large Conservatory Decorated after Natural Style.

Messrs Dick Radclyffe & Co. are offering lessons in this department of gardening, and, as a matter of taste, that we present the accompanying illustrations with that firm's remarks applicable to each.

The first illustration (fig. 1) represents a conservatory or fernery, which is a source of amusement and a pleasant picture in any Conservatory, and from the little attention which Ferns require, they are always fresh, and after the first expense are the most economical to keep up. They

can also be successfully arranged where no heating apparatus is provided, and are more especially adapted for such situations where flowers do not succeed. These remarks are also applicable to the next design (fig. 4), which represents a landing or staircase Fernery. The next picture (fig. 5) is a charming effect to be produced during summer months in the drawing-room grate, and will prove

is entertaining than the usual "fire stove" ornaments. The design on fig. 1 shews a fernery made entirely of Virgin cork; the same design, however, can be produced in any other material, but cork is specially recommended where heavy materials cannot be used. We beg to recommend all persons possessing some unsightly nook or corner, to have them effectively arranged, to correspond to the illustrations presented likely to give many new ideas of arrangement. The success of Conservatory decorations depends entirely on the situation of the house and the selection of plants. Many aim at too much, and content themselves with what really will succeed; effect does not depend on the quantity of the plant, as many modest and inexpensive varieties produce the most charming result. If, therefore, a selection is made according to the situation of the Conservatory, and not so much attention paid to the individual taste of the possessor, success will be found in many cases where failures have attended the attempt. Who has not, at some time or other, been to a house where the Conservatory has been an eyesore rather than a pleasure, and what the cause? Not from the want of means, as, perhaps, much money has been spent on it. The answer will be found among the following:—A selection has been made to the taste of the purchaser,

thoroughly independent of the requirements of the Conservatory; or the plants, if suitable, have been allowed to attend to themselves. It is the mistaken notion of many, that a plant has but to be put under glass, and no further attention is required. Now this mistake we wish to call special attention to, as unless proper attention is given to the plants they cannot be expected to do well; our object in making these remarks is to induce those who have laboured under these ideas without success, to give a little more attention to the requirements of the plant, in which case success must attend the endeavour. To all, therefore, who possess a love for Horticultural Decorations, we would commend a little more attention being given to the natural mode of planting for pleasing effect. We have no doubt a suitable and effective tableau can be produced at a cost varying to the requirements and suited to all pockets, and which will always be found a source of recreation and research alike amusing and instructive.

Although the engravings given fully illustrate our subject, we earnestly recommend all who contemplate decorating their houses in the manner we have pointed out, to pay a visit to Messrs Dick Radclyffe & Co.'s establishment in High Holborn, where they will see much to guide them.

RECIPES FOR COOKING SPINACH.

PICK the Spinach carefully, seeing that no weeds or stalks are mixed with it, and wash it thoroughly through several waters. About fourteen quarts of Spinach will be sufficient for five or six persons. Put this quantity into a very large saucepan, with about half-a-pint of boiling water and three heaped table-spoonfuls of salt. Press it down frequently with a large spoon, that it may be done equally. In about ten minutes it will be perfectly tender, when drain through a colander, pressing until quite dry, and chop it finely. Put now into a small saucepan with an ounce of butter and a seasoning of pepper; stir the whole over the fire until quite hot; then put on a hot dish, and garnish with sippets of toasted bread or slices of hard-boiled eggs. Poached eggs are also frequently served with Spinach, when they should be laid on the top. Lemon-juice or white vinegar is considered an improvement.

BEET-ROOT SPINACH.

The tops of young Beets, if treated in the same way as Spinach, but boiling them for half an hour instead of ten minutes, will be found very similar to Spinach and quite as good. This dish should be garnished with slices cut from the roots of larger red and white beets, and seasoned plentifully with pepper.

FRENCH METHOD.

Either of these may be dressed with cream after the French fashion. Thus, after the Spinach or the Beet-tops have been chopped and returned to the fire in a small saucepan with a little melted butter, add half a pint of cream, which has been previously boiled to prevent curdling, and simmer for five minutes; just before removing from the fire, add a small teaspoonful of powdered sugar and a very little grated nutmeg.

THE COUNTRY GENTLEMAN'S MAGAZINE

DECEMBER 1872

LORD DERBY ON LAND, LABOUR, AND GAME.

AS President of the Lancashire Farmers' Club, Lord Derby last week delivered the inaugural address before a large meeting at Preston.

He said:—In bringing together this farmers' club, we are following an example which has been set—and, as I believe, usefully set—by various other counties. The formation of these bodies has been too recent to enable us to judge of their working, but I may say generally that they have two objects in view—one to give a fair hearing to all such persons as may have practical suggestions to offer on agricultural matters, or on the mutual relations of the various classes engaged in the cultivation of the soil. The other, which I hold to be at least equally important—to bring together for the discussion of all such new ideas as may be proposed an audience which shall be experienced and critical, so that if, as will happen in the best regulated public meetings, notions should be put forward which are plausible on the face of them, but impracticable in their working, they may go forth to the general public accompanied with the comments of those who have heard them, and who are better able to estimate their real value than the mass of outsiders can be. The landed interest, whatever else it may complain of, cannot possibly complain of neglect. Everybody wants to do something to it, or with it; but, unluckily, many of the loudest talkers on matters connected with land are people

whose agricultural knowledge is about on a par with that of the cockney on his travels, who said he thought he should know malt from barley if he saw them growing together. Farming on paper is one thing, farming in practice is another; and when all the world has got a theory of some sort about the soil, it is just as well that some of the talking at least should be done by parties who have not merely got up their knowledge for the occasion, as a lawyer gets up cases from a brief. The subjects which will come before this club are many—some of them I will name by-and-bye; but there are three or four which suggest themselves as the most likely to be discussed, and the most important; and on these, with your permission, I will say a few words first. One of these is the labour question.

LABOUR AND WAGES.

A great deal has been spoken and written lately about the scarcity of labour, and the consequent raising of wages. Now, on that matter it is hardly possible to make any remark, unless of so vague a character that it can serve no useful purpose that will be applicable to other localities than one's own, or which elsewhere may not be misunderstood. Are we not a little hasty in speaking as if a great permanent rise in the cost of English labour had taken or was taking place? It may be so, but we know this—that an exceptional development of trad:

and manufactures has created an exceptional demand for hands, that such periods of suddenly enhanced prosperity seldom go on long without a check, and that it is by no means proved that when that check occurs—and some people think it is not far off even now—the demand for labour may not subside to very nearly its former level. When I notice the change since 1868, I am compelled to ask what there is to prevent the ebb from succeeding to the flow—what should hinder the pendulum from swinging back again to its old position. Of course I may be wrong—I am suggesting doubts rather than asserting propositions of which I feel certain; but I shall not easily believe in that social and economical revolution which the press is so busy with until I see one of two things—either that the number of yearly emigrants from these islands equals, or approaches, the natural yearly increase of population, or that the working class here use the same means as the French peasantry habitually do to avoid being burdened with more mouths than they can find food for. The last of these two conditions is so utterly improbable, considering the ideas and feelings of our people, that I may safely put it aside; and as to the first, I am not aware that there has been any perceptible decrease as yet in the rate at which our population grows. Nobody can feel unkindly towards those poor fellows who are only doing the best they know to better themselves; but I suspect that in the majority of cases they have miscalculated their strength, and will not do themselves much good. In these parts our troubles of that kind are fewer, though we may have had our share. For many years past the competition of the towns has raised wages to a higher level here than elsewhere; but the condition of the labourer is not improved, and though there may be some difficulty to contend with, the farmers in Lancashire need not be alarmed at the want of hands. It is true, the use of machinery is only beginning, comparatively speaking, in farming, and it is impossible to predict what economics and improvements will be possible in that

direction. Meanwhile, it is undoubtedly desirable to do what we reasonably can to keep our labourers with us. I would never discourage any young fellow from emigrating if his mind was really set upon it, and if he had an idea of what was before him—indeed, I have very often helped men to go; but unless English labourers are a good deal stupider than I take them to be, they will find out that emigration is a lottery.

CO-OPERATIVE FARMING:

SIR BALDWIN LEIGHTON'S SYSTEM.

Well, what are we to do with them at home? One of the favourite schemes of the day is to turn them into farmers; or rather into fractions of a farmer, by adopting what is called the plan of co-operative association, and giving the soil to be cultivated by the actual workers upon it. Now I am not at all a disbeliever in the co-operative principle within certain limits. It is clear that associations of men individually poor will be at a disadvantage in two cases—one where a large command of capital is required, and where they may have to lie out of their money for a long while; the other, where risks are to be run, where immediate decisions must be taken, and where, therefore, it is necessary that the firms directing operations should not act with that entire freedom which a man can hardly feel when he is dealing with the property of other people. Well, in the case of farming, it seems to me that the first of these difficulties is, if not fatal, yet very serious indeed. There can be no tolerable farming without capital; a body of labourers clearly have not got capital of their own, and, as they have no available security to offer, I don't see where they are to get it. I am aware that instances have occurred where benevolent landowners have themselves advanced the sum required—but that is charity, and not business. In the first place, it is clear that landowners, as a body, would not be able to take that course. In the next place, even if they had the money, it would be a very speculative investment; and besides that, farming with capital of which every shilling is borrowed is not, for the occupier, a safe and satisfactory

Moreover, there is another condition which philanthropists are apt to

It is very well and it is very just to say that men never work so hard as when they have a direct personal interest in the result, that is excellent doctrine for prosperous times, or where there is a reserve to draw upon. But farmers have losses as well as gains, bad years as well as good years, and inasmuch as labourers must live, they have nothing laid by, it seems as if in years when crops were exceptionally bad, or when prices were exceptionally low, the experiments of co-operation run great risk of breaking down.

Still, I don't say that it should not be tried, or that in some form it may not be a good answer; only with our present experience I should advise no one to put more into it than he can afford conveniently.

But why should not the question be experimentally tested? There are plenty of co-operative societies in the market, the trading co-operative societies of this country are very numerous, they have made a good deal of money, and their supporters are enthusiastically zealous of the cause. A very little experience is all that is wanted; let them try a few farms and see whether they can succeed to their advantage on their principle.

If they succeed, nobody will grudge them the success; if they fail, we are only where we were before. There is a modified form of co-operation which consists in paying labourers a share of the profits made on the land. Some plan of that kind has lately been recommended to us by very high Parliamentary authority. I think, however, that it is a good deal of difficulty. In the present state of things, it is not always easy for the farmer to know exactly what his profits on his land are, and still less easy for him to prove it, as he would be bound to do, for the satisfaction of his men. In the next place, it does not seem to be founded on any principle of justice that I can understand, that a ploughman or a carter's earnings should depend on the state of the crops or of the weather. No doubt he would be willing to receive a bonus in good years, but he would not at all like a corresponding

deduction from his earnings in bad years. And yet it is not easy to see how you can have one without the other. While on this question I would recommend it to your consideration, whether it is not both just and politic to distinguish, more than is usually done, between individual labourers, as regards the rate at which they are paid. One man's work is worth half as much again as that of another; it is a discouragement to the really good worker not to have that difference recognized; and, looking at it in another point of view, by valuing each man's labour separately, you encourage the spirit of individual energy and ambition, rather than of combination and collective action. Five-and-twenty years ago the theory used to be that if you could only give to every labourer an allotment on which he could grow produce, either for sale or for his own use, you would have made a great step towards improving his condition. I think there was reason and sense in that view, though more stress may have been laid upon it than it would fairly bear. There is no doubt that to hold a bit of land in that way attaches a man to the soil, and that it is, so to speak, a savings-bank for his labour. On the other hand it is argued with force that if the allotment is far off from the house, and if it exceeds a very moderate size, the labourer is drawn off from his regular work to attend to it, and, being divided between two employments, neither does as well for himself or his employer as he otherwise would. It is a fair matter for discussion, and I hope we may have some light thrown upon it.

THE GAME LAWS.

You will expect me to say something on the question of game. It does not much interest me personally, and I shall be quite ready to acquiesce in whatever arrangements either law or custom may sanction. But where there is a good deal of prejudice on both sides, a word or two in a spirit of at least intended impartiality may not be quite useless. There are two issues involved—one, what it is wise for every landlord to do of his own free will; the other, what Parlia-

will, and to my mind they always should, be matters of arrangement between him and the landlord. It is not the landowner's interest to have his farm run out during the last four years of the lease, and it is not the tenant's interest to run it out, if he can either secure the value of what he has put in or a renewal of his tenancy. They are both gainers by coming to an agreement, and I do not see that either fresh legislation or the intervention of any third party is necessary. In the case of a yearly tenant, the claim is certainly stronger, and if in cases of that kind grievances arise, as I have read in the newspapers, I think the question of legal protection is a very fair one to raise. But I speak with no great confidence, for in my experience no dispute has ever arisen on these points. In Ireland it used to be pleaded with truth that the tenant did most of the work of permanent improvement on the estate, buildings included—and that, therefore, he had a right to the value of them on leaving. But in this country, at least in Lancashire, all works of that kind are landlords' works, and the Irish claim does not arise. The obvious remedy for grievances or misunderstandings on this question of improvements is, that before they are undertaken by the tenant in each instance, there should be a definite agreement whether they are to be paid for or not, and how their value is to be estimated. Speaking as a landowner, I am not in the least afraid of *bona fide* claims on the ground of improvement; but I suspect that some at least of those who put them forward have got in their minds a very different kind of claim from the Irish demands for com-

pensation, as it is called, for 'disturbance—in other words, the infliction of a fine on the landlord for putting a bad tenant out and a better one in. That demand never seemed to me reasonable, even in Irish legislation, and in England it would be equally without precedent and without justification. And that brings me back to what I said at first—the importance of a clear definition of mutual rights. All that miserable Irish trouble about tenant-right, of which we have probably not seen the end yet, arose in the first instance from the muddle-headed way in which both parties went on, laying down no fixed rule, acting on no definite principle, but settling each case as it arose, or leaving it unsettled, until the confusion had become inextricable, and popular violence had practically superseded law. We shall not fall into that mistake, but it is one great use of such discussions as ours ought to be, that vague and unsound notions get swept away, and that we come to see clearly what others have a right to expect from us, and what we are entitled to claim in return. It rests with you whether this society is going to be of real use or not. You have an immense range of subjects to deal with—try to deal with them briefly, practically, thoughtfully. With our system of newspapers the most obscure person who is master of his subject may start an idea that will spread through the whole country; and if for every grain of truth we should happen to produce a good deal of chaff, why the chaff blows away in the fresh air of controversy, the grain, be it much or little, remains behind.

LORD PORTMAN ON WAGES AND UNIONS.

IN his charge at the Dorset Quarter Sessions on Wednesday, Lord Portman dwelt largely on the agricultural labour question. I think, he said, you will probably feel that I ought to say a word or two about that which is now occupying men's minds very much—the position of the employer and the employed. Some people have said that the justices ought to interpose to endeavour to settle this great question of the wages of those who are employed in agriculture in particular, and in all the other occupations of life; but it is my duty to tell you we have no power, no authority, and that it is not at all within our province as magistrates to interfere in this matter at all, because the power which we had was repealed in the year 1813, and without troubling you with a long story about the old law, I may remind you for a moment what I mean by saying our powers were taken away in 1813. In the fifth year of Elizabeth, chapter 4, in 1562, magistrates in quarter sessions were ordered every Easter to fix the standard of wages for everybody, be he artizan, mechanic, agricultural labourer, farm bailiff, or what else he might have been. They were ordered by that statute to fix the wages, and any man who either paid or received higher wages was liable to be committed to prison for fourteen days. It is antiquarian law, and scarcely worth looking back to, except for amusement. I am sure you, as an antiquarian, wish to be reminded of it. I cannot do better than quote the words of the statute. "That whosoever shall pay or receive more wages than the justices shall order, he shall be committed to prison for fourteen days." The law was repealed in 1813, and since that time the wages of the agricultural labourer have been regulated by the Poor-law, and the standard of wages has been fixed by the Poor-law Commissioners. I am sure you will be glad to hear that the law is now in force, and that the justices are not to interfere in this matter. I am sure you will be glad to hear that the law is now in force, and that the justices are not to interfere in this matter. I am sure you will be glad to hear that the law is now in force, and that the justices are not to interfere in this matter.

count to exceed £8 by the year, with his meat and drink, and that the wages of a carter were in no case to exceed 2s. 3½d. per week, with his meat and drink. That was the standard of value, which will, I think, in some degree account for what are called, the low wages in this part of England. They were fixed in the old time, and from year to year they have gone on in that same sort of low standard, which perhaps has tended very much to give the southern and western counties a reputation in these days they do not deserve. The order of the Court in 1792 and 1793, at Easter, was to confirm the old orders, and in one of the early years of 1800 the then order of the Court was a very simple one—that all wages should be 1 bushel of wheat and 1s. per week. Now, then, you will see in a moment the evil of that system. At the adjourned sessions, held the 1st of December, 1792, the Court of Quarter Sessions resolved:—"That, having taken into consideration the difficulties which the poor labour under from the present high prices of corn and other necessities of life, the justices within their respective divisions will make an order on the parish officers on the complaint of every industrious and peaceable poor person, which shall appear to be well founded, to relieve him or her with such sum as shall make up, together with the weekly earnings of him or their family, a comfortable support for them." Here there is the foundation of making up wages out of the poor-rate. That system went on from the year 1792 to 1813. In the latter year the new Poor-law came into operation, and Boards of Guardians regulating the relief of the poor specially take care that they do not make up wages out of the poor-rate. Well, then, wages from that time—1813—there being no authority to fix the standard of wages, became a matter of bargain between master and

that is clearly the right course of pro-

There can be no doubt that every man must make an individual contract with the master he wishes to employ; the man he wishes to employ; and therefore, so far as the law is quite open to make such contracts, man may think fit. So far for the

Now let us see what the law at present is. It is this. The Masters' Contracts Act, passed in 1868, enables the law to enforce these contracts which are made. Any contract made by any man which the master breaks the law can enforce, and any contract which the man breaks the magistrates also enforce. And under that there are various modes of enforcing the Act. The Act is perfectly reciprocal to both parties—and the magistrates are to serve both as justice may require. When comes the Act called the Unions Act, 34 and 35 Vic., chap. 61 in the year 1871. That only in a particular county and this particular question, inasmuch as it says the very union that are to be enforced must be registered; and if they are not, no money taken by the receivers may be put into their own pockets for their own purposes, and the law thinks he is going to get something for paid contributions to the union, so he can get any money if the treasurer does, because there is no law to force him, unless the rules are registered. I know, the rules of what is called the Local Union, which is recommended for of this county as a great resource are not registered. Therefore, in fact, the men are paying their money who choose to spend it, and have that they will be paid what they are promised shall be paid. The law is the Criminal Law Amendment Act, chap. 32, of the same year. That measure restrains all violence, and not to coercion. It is applicable to all. If a master uses violence—as is in the Act—to constrain or coerce

his man, he is liable; if a man uses that violence towards his master, he is also liable, the Act being entirely reciprocal like the other. All the three last Acts are in full operation, and, if necessary, the magistrates will not fail to carry them into operation. I may observe to you, in reference to the last Act but one which I have mentioned, that the law recognizes union. It is not for us, therefore, that union is illegal. A union may be very foolish, and may be very wrong; it may be very tyrannical and very despotic; it may defraud men by not being registered; but these are offences with which we can deal. However, to say that a union as a union is wrong cannot be maintained. All societies are unions together under all sorts of names. In one place they are called congresses, in another synods, in another chambers, in another associations, and so on; but all these are unions, and there can be no reason in the world why the labourers should not form their unions, if they do so honestly and for a good purpose. There can be no more reason why the labourers should not have their unions than that we and other people should not have ours. I venture to say this because some people have fancied that from the very fact of a man being in a union he is doing an illegal or wrong thing. He may be in a very bad union, and in one for a very bad purpose, but the fact of joining such a body is not an offence against the law. Now there is another class of persons to whom that law applies particularly, viz., the men who amuse themselves by giving lectures, those who come into a district and fancy they know everything about it, although they were probably never in it before, and they really know nothing about it. But they have as good a right to walk about this county as anybody else, and to make speeches where they like. There is no prohibition, and there is no reason they should not tell all the truth they think it desirable to tell; but they should be very careful that they do tell the truth, they should not believe a master who says he gives more wages than he really does, or a labourer who says he receives less than he does, but they should endeavour to as-

rence has been shewn to them, and experience treated as of no value what-

Let the reader imagine for himself would be his own feelings when—as an authority upon any subject, he seeks to enlighten others in reference to it, in whom the absence of precise information is a matter of deep concern to the country as well as individuals—yet he is repulsed as having a mercenary end in view, and by signs and words, is given to understand his counsel and advice are not wanted. Again, if possible, estimate the chagrin and disappointment which must ensue from an avoidable contact with some of the quacks of our country cow-leeches, from the want of the slightest scrap of information gleaned, although whole districts are afflicted with no other kind of help.

Continental veterinarians are well educated, and many, of high aristocratic bearing, and eligible for elevated civil posts under government generally. They are well read in their science and have a thorough love for investigation in it, and with these qualifications are constantly commissioned by their respective governments to go abroad and inquire into ravages of diseases among stock, and to collect all the knowledge possible, not only to enrich their already largely accumulated stores as of intense value to their nation, but also to fortify their teachers in the education and training of future veterinarians. Witness the prevalence of pleuro-pneumonia, the “foot-and-mouth disease” in Great Britain since 1842, and more recently of the plague, many eminent men have laboured in this country in their official capacity. Their knowledge of these diseases, from direful experience extending over centuries, is therefore much greater than ours, and likely to be of immense benefit if applied, and, after careful study, applied as the circumstances will admit. For all we know in Britain, all that we could do to bear against our national calamity, the cattle plague, in 1865-6, we are indebted to French and German veterinarians generally.

All suggestions found successful, the deduction, from their experience

primarily, which when given for nothing, was altogether unheeded or ignored. The dealings with which we, as a nation, have met the scourges that have run through our land, are unmistakable evidences of the low estimation that is placed upon the value of stock-raising and stock preservation, and with the means at our command, the enterprise and zeal exhibited in every other capacity, it is a matter of great surprise that the science of veterinary medicine is so far behind, compared with its condition in other countries, having far less pretensions towards position either in commerce or wealth. The profession in Britain offers no inducement for men of education to enter it; on the Continent every encouragement is held out to the learned, while the study of veterinary medicine is reckoned not even second to that which applies to man himself. Here we are content to allow men of the most illiterate habits, having few or no pretensions to learning, and therefore with no knowledge of such essential collateral branches of study as chemistry, botany, or even subordinate ones, to prescribe for our stock, because they will be satisfied with a small fee, and are safe to offer no advice that will be above the comprehension of the least progressive farmer.

Although we do not desire to raise all so-called qualified men, or those holding the diploma of one of the recognized colleges, to the rank of the learned and illustrious—we would that we could!—we nevertheless assert, without fear of contradiction, that the stock of Great Britain would be far safer in the hands of the worst of these, than cared for as it is in far too many instances in our rural districts. At the present time there are not more than 1534 legally appointed veterinarians, and these are distributed over Great Britain and the colonies, &c., as follows, the figures being taken from the Register of the Royal College of Veterinary Surgeons. In England there are 998; Wales, 24; Scotland, 204; Ireland, 65; America, 55; Australia, 36; New Zealand, 6; Tasmania, 1; British Army at home and abroad, 145.

If we look more closely into the lists, we

shall not fail to observe how the practitioners are distributed to the detriment of our cattle breeding and rearing districts. For the most part they are located in large towns, around which they travel in different directions, probably not more than 5 or 6 miles. In the whole county of Lancaster, for example, there 101 veterinary surgeons, 26 of whom are residing in Manchester, 22 in Liverpool, 6 in Bolton, and 3 in Oldham, leaving 44 for the other towns and country districts. In Middlesex there are 118, and of these 112 reside in London and outskirts. In Yorkshire there are 116 veterinary surgeons, three or four being located in every large town, and every small one as in Lancashire, having one or more; in one or two instances only are villages supplied. And this is the general plan throughout England, Ireland, and Scotland, to the almost exclusion of the rural districts.

The cause for this is obvious. In all towns there are a number of horses kept for trade or manufacturing purposes, pleasure, &c., and these yield a larger and more continuous demand for medical care and attention than the country districts do; payments are also made at shorter intervals, and profits as well as charges are considerably higher. Besides, the veterinary surgeon may have more genial associations in town than in country, his work is more cleanly, and he therefore can appear more respectable. A country practice, on the other hand, is very irregular in consequence of changes of temperature, &c.; long distances have to be traversed, and at all hours; there is much dirty work to be done, and, with these inconveniences the veterinary surgeon, if he is a man of education, is shut out from society in which he can enjoy the honours of freedom, and competition with his colleagues in competition with the numerous quack doctors, who charge an hour or a penny in fee for their knowledge, and who are content with working lower wages. Practitioners trying to establish country connexions suffer from the same disadvantage. We have known a man being sent for miles

to visit some case, from the nature of which he is necessitated to take his horse and gig, pay the cost of one or two tolls, spend considerable time with his patient, and his net profits do not amount to the pay of a mechanic. Besides which, he rarely receives ready cash, except for isolated operations, and his accounts are paid only at very long intervals—seldom under twelve months.

With such profits, and very irregular calls, men who have been directly brought up cannot live. The itinerant quack will wander over miles of country with pockets crammed with medicines, which he never fails to dispose of; and when he is hungry a hunch of bread and cheese, with probably a few onions, form a good repast, and these are still more congenial to his taste, if he can wash them down with copious draughts of ale. He loafs about with grooms, stablemen, and cowherds, and will smoke, drink, and swear with the best of them. His establishment is usually very small, and costs little to support; being a bird of passage, he is as content at the pot-house as if he were in his own parlour. His brains are so replete with knowledge that he never needs to consult books for anything different from that which he practises. His accounts are not usually of long standing, for he usually draws as he goes on, not unfrequently, and doubtless in ignorance, drawing more than is due to him, on which occasions he never fails to find that such a cow wants a "bit of a drink," or a horse requires a ball, and so matters are set somewhat straight.

Such is the state now too common in this country, and to which, at the present time, we may attribute the almost entire absence of means by which the spread of diseases among our cattle and sheep might be prevented. It is impossible to organize any suitable system where men of such profound ignorance prevail, and have the ear of men who should know more of what belongs to stock preservation. A premium is set upon a system of drugging, and even poisoning, of animals, while there are no steps whatever taken towards avoiding the evils which generate the affection. It has been argued that veterinary surgeons generally are ignorant of

the nature of the diseases of cattle and sheep, and they do not care to attend them. We are sorry to admit that the statement holds good in a measure, yet assert the objectors have not only the remedy in their own hands, but have also to bear much of the blame for the cause.

We have already given one instance in which profits are meagre, and we may supplement it by many others, such as the heavy cost of drugs, large doses being so constantly required, which in the practice of many men are confined to the more costly agents, leaving the barest margin for gain; also the expensive nature of instruments and apparatus, with their rapid breakage and wear, and frequent losses, heavy expenses in working a country district, &c., &c. To these, many may object by saying, "our veterinarian uses no costly drugs nor instruments, and has very few of either, and the latter are of the rudest and most common kind," and we reply, "such a fact proves how carelessly he estimates his charge; how profitless it must be; and points out the necessity for a thorough reform on *both* sides."

But there is another error which the agriculturist and the veterinarian constantly perpetrate, both looking to their own ends, but the major part of the blame rests with the stock-owner. It is a common occurrence for disease to break out in a herd and sudden deaths to follow; sometimes an isolated carcase is found, at others, more. There are also cases of various kinds of disease among stock of a more tardy character, over which the veterinarian has had care, and in his absence one or more animals die. In the first instance the cause of death is *not* known; in the second the cause may be tolerably well suspected, yet, nevertheless, in neither does the veterinary surgeon make a special visit and *post mortem* investigation, simply because the farmer rarely sends for him to undertake the task, such being probably the very remotest act he would think of. "What good can there be," he argues, "in seeing a dead carcase? We know the animal is dead, and there's an end on't." The veterinarian does not go because he cannot afford to waste his

time; as far as he is concerned, all is satisfactory and plain to himself, and he knows quite well that such opportunities for examination are valuable records lost to him, with which his mind would be refreshed from time to time, and his discriminating powers strengthened, and he would be enabled to deal more successfully with the prevention, if not cure, of such cases in the majority of instances. This common system of neglect is pregnant with some of the most awkward results, especially in times of wide-spread contagious diseases. What can be more alarming than to proclaim the existence of a rapidly fatal malady, with no other evidences than sudden death and few external signs? Yet this has been committed over and over again. Malignant epizootic aphtha, ignorantly styled "foot-and-mouth disease," and also another affection of cattle known as "malignant catarrh" have frequently been mistaken for "plague" in its form, and wanton slaughter has followed. The common, curable, and indigenous form of pleuro-pneumonia, in the absence of well-conducted *post mortem* investigation, is almost inevitably mistaken for the rapidly spreading and fatal contagious variety; and besides these we might cite numerous analogous instances in which sheep, pigs, horses, dogs, are sacrificed, and consequently the farmers themselves, by the neglect which lies mainly at their doors.

We are certainly not going to exonerate members of the profession who attach no value to the practice of making *post mortem* examinations, or even seek to impress their false deductions upon the owner of animals. Such investigations require nice discrimination and comparison of different structures; a thorough acquaintance with anatomy and physiology; and possibly some might expose their ignorance of these, as well as their detestation of what they denominate "a dirty job." Men who reason thus are not worthy of the profession calling them members; they do not promote either the interests of their employers, nor add to the lustre of their name or the science they profess to understand; and as long as they follow it entirely for the filthy lucre it may yield to them, they

cannot expect to become more than mere automats, moved only by the impulse of selfish desires and mercenary motives.

The want of ability to conduct accurate investigations into the causes of disease, as well as the cause of death in animals generally, and we may add, to carry on a successful rural practice, is not always entirely the fault of the practitioner. The system of education has much, if not all, to do with it. The training of veterinarians has not been as well conducted as it might have been.

The period of time required by the college regulations—viz., two sessions of five months each, is by far too short to enable any man to acquire proficiency in the many subjects which comprise the veterinarian's knowledge and stock in trade. The fees likewise are too low.

Although our seminaries have had the effect, since their first establishment in England, of wresting from the hands of many quack pretenders and itinerant vendors of drugs much of the practice among domestic animals, yet they have not accomplished one quarter of the work which they might have done. They have not set themselves before the world as institutions in which the investigation of science shall precede its exposition, but on the contrary they have been the nurseries of private opinions. Situated as they are in the midst of large towns or cities no opportunities are offered for the cultivation of observation and research, except upon the carcase, which is usually that of a healthy animal slaughtered for the purpose of dissection. The patients are mostly horses besides which a few dogs may be admitted, but sheep and cattle are rarely seen, and no active funds taken for the purpose of procuring them. The students are therefore unable to acquire that sound knowledge of the diseases of cattle, sheep, and pigs, which is so essential to the success of a rural practitioner. Many of our graduates have been young men who have not seen six months practice

in the department, neither delivered a lecture of any kind in their lives. Thus their orations must be extracted from books, mostly written *in extenso*, and, as such, read year after year, with all the errors that have been added by the piratical compiler in order to render them novel and pass them off as original productions.

What we have to complain of at the present time is the want of greater unanimity and sincerity among the heads of the profession, as concerning the all-important principle of education. The great principle hitherto acknowledged has been entire opposition to change or improvement. The consequences are that the profession is apparently as it was nearly a hundred years ago, still in its leading strings—dependent upon medical men as examiners, preferred on commissions, as if they knew more about the ailments of domestic animals than veterinarians; and they have also been selected to represent us in foreign assemblies of veterinary surgeons!

If this action had been enacted at the period above-named, when none but unlettered men existed, it might have been borne without a murmur, but after men have devoted years of attention, toil, and study to the dearest object of their lives, and by unwearied zeal in the cause of science have raised the profession through opposition, strife, and all manner of obstacles to progress, to a dignified place among the institutions of mankind, it is cruel that they should be passed by, and see others, who have done nothing, take the position with all resulting emolument and honour.

We are not inclined to convey the idea that nothing has been effected, or that the profession is in a moribund condition, but we have too much of the element of stagnation in them; they should be under the control of Government. Until Agriculture obtains clearly the connexion that exists between itself and Veterinary Science, and obtains a proper representative in the person of a Minister of Agriculture, the progress we hope for will not come. The thousands of animals that cover our hills represent an immense annual value, and from

the enormous losses yearly incurred by disease, indigenous as well as imported, it is obvious greater efficiency is required from somewhere to battle with them, and render the process of stock breeding and rearing more profitable. That efficiency with all the required machinery may be found in the army of veterinarians that are turned out from our schools each year, all that is wanted is proper organization. It is simply absurd to suppose that these men will live on science, however much they may love it, and equally so to imagine that they can fill, with honesty, two positions having entirely opposite characters, expecting good to result. Yet in our "penny wise and pound foolish" policy under the Contagious Diseases (Animals) Act, 1869, a veterinary surgeon is set down to serve government, which monopolizes all his best time, and sell his clients, who find him the most work. If the State requires

men to act as inspectors and carry out the provisions of the Act, it should employ and pay them entirely.

The great want of veterinarians is felt in the country districts where the stock is raised and fed. The duties of veterinarians should be confined to special districts, and exerted mainly in the prevention of disease. The annual losses now incurred would more than pay for this arrangement, as well as proper and separate systems of government inspection, and thorough national insurance and indemnification. All these are indispensable for the preservation of our stock, and the lessening of our dependence upon foreign countries. The more we can accomplish this, the greater will be the powers of Veterinary Science to battle with disease, and the more extended its progress as one of the branches of learning so instrumental to success in our social economy.

LANDLORD, TENANT, AND LABOURER.

MR BENYON, one of the M.P.s for Berks, and President of the Pangbourne Ploughing Association, at the recent annual ploughing match, in proposing success to the Society, remarked that they were drinking (we quote from the *Reading Mercury*) success to the farmer, success to the labourer, and success to agriculture generally. Instituted and supported as that and hundreds of other similar associations were by the farmers of the neighbourhood for the benefit of their poorer neighbours, anything which militated against the welfare of the agricultural classes must seriously affect a society like that. This brought him to consider the nature of the relations that existed between the different classes of the community, rendered more important at the present time in consequence of those proceedings which had rudely interfered with the good feeling between master and servant—proceedings which he was firmly persuaded

arose not from any want of good feeling on the part of the labourers towards their employers, but from the gross misrepresentation of paid agitators who stumped it through the country for the purpose of setting class against class, and of stirring up enmity where nothing but goodwill had previously existed. No doubt there were black sheep amongst farmers, as amongst other classes of society. There was the hard taskmaster, and the violent-tempered man; the man who tried to get as much for his money as possible; and here and there they might perhaps put their finger on an absentee landlord, who took no interest in the welfare of those who occupied their land, and who thought it too much trouble to attend institutions of that nature. But surely it was very hard to condemn the whole class for the delinquencies of the few, and to take violent action against those who were above them, simply because they were above them, and not because they had to

complain of their conduct. What was it that they were told? In the first instance, at the present hour, labourers, regard being had to the price of bread, bacon, and pork (he said nothing of beef and mutton, because that was not taken into account) were getting better wages than was ever known within the memory of the oldest person in the country. They were told that the labourer ought to be better fed, better housed, and better taught. He confessed that the labourer ought to be better fed. That was a rap on the knuckles for the farmers. They ought to be better housed; that was a slap at the landlords. And they ought to be better taught; that was a slap at the labourers themselves. With regard to the labourer being better fed that meant that the farmer ought to pay better wages. It had been said that a labourer could not live on 12s. a-week, but had it not been said that the average earnings of a labourer, to say nothing of his wife and children, were 14s. 3d., 16s., and 18s. per week? Then they might really lay aside all arguments based on 10s. and 11s. per week as utterly beside the question. If they were to raise the wages of their labourers to 16s., and 18s. per week, would their families be the better for it? In some manufacturing districts, mechanics were paid from £3 to £4 per week, but what was the result? Did they not employ their time for two or three days in a way they ought not to until

the money was well nigh spent, and then go to work again? It was, therefore, quite clear that the labourers must be prepared for receiving these increased wages. They must be educated in order to make them fit to receive additional money in a manner that would be creditable to themselves and useful to the nation. Then it was said that the landowner ought to provide better cottages. The fact was that a very large proportion of the cottages in the country did not belong to the landowners at all. They were the property of speculators who built the cottages at the lowest possible price. Then the question arose, were the labourers sufficiently educated to occupy good cottages? In some cottages there were three bedrooms, and was it not notorious that frequently the third room was not occupied by the labourer's children, but by lodgers, and in some cases the remedy was worse than the disease. As to education, did the labourers avail themselves of the opportunities afforded them? Were they alive to the benefits of education? It was not for him to depreciate education in Greek and Latin, and the use of the globes, but the education of the labourer ought to be confined to what was called the three r's—reading, writing, and arithmetic. A labourer did not require anything more. The great point was to improve the labourer himself, and make him appreciate the advantages offered to him.

DAMAGE BY GAME AND RABBITS.

TER in the *Aberdeen Free Press* is the following account of a tour of Aberdeenshire in the summer. The locality chosen, he says, was which complaints of injury by game have never been heard of in would be admitted perhaps to be a case. The ground traversed present a valuation of £3000 to the shooting was let to a tenant, and the farmers were laid under no restrictions.

In that district there are a good many that afford excellent cover for both here and there opener spaces of moors, or heather that exactly suit the hare. The character of the land and open—is also favourable for the formation of rabbit burrows. Every-where is evidence of skill and industry in the cultivation of a soil of only moderate productiveness, and a good deal of what has been a limited time been reclaimed from natural waste.

Observation extended over about a week, of those which from their situation afford samples of the severest damage and also of the medium damage done by rabbits or hares. One tenant, free of plague was rabbits, estimated the loss by destruction among his turnips in winter as averaging £1 per acre of whole crop; but would be badly off, nearest the wood, but £15 per acre was a fair estimate, and that was from the annoyance and disappearance of the thing. Another tenant estimated much from rabbits in the loss of his fields on a farm of 100 acres, estimated his loss for three years at £50, taking into view turnips, grass, or £50 a-year. A neighbour, on our inquiry, expressed his belief in the substantial accuracy of this estimate, incidentally confirmed during our

excursion in a perfectly satisfactory way. Happening to meet the previous tenant of the same farm, we asked from him an estimate of his yearly loss about the close of his lease. This he put at £60; but he added that the circumstances then were a little exceptional. The previous game tenant's lease was also drawing towards a close, and he had been preserving for some time more rigorously than usual preparatory to a grand slaughtering off before he should quit. Damage to grass or grain crops is not so easily estimated as in the case of turnips. One tenant thought £2 an acre would represent the loss on some of his most exposed fields of oats when the vermin was about the maximum. He had looked pretty closely at the damage to his turnips without arriving at a definite estimate; but could give an illustration that would speak for itself. He had occasion in early winter to leave a patch of turnips, that would have amounted to five or six loads as they stood, unpulled at a particular part of the field. Snow and frost set in, and the patch was left thus for several weeks. At the end of that time not a single turnip remained to pull! Simply "cauppies" indicating where they had been!

Under the existing state of things, the tenants have, naturally enough, made certain efforts to protect themselves. As a matter of course, they and the game tenants have not concurred in opinion as to what constitutes excess of vermin, and this circumstance has led to scenes that have their amusing side. For example, a tenant who can use his gun with effect sets out to shoot rabbits on his farm when he is dogged, step by step, by a gamekeeper, who sticks closely to him for the express purpose of destroying his chance of getting a shot. Another time the farmer is wiser, and when he sets out, plants watchers at each of two points that command good part of the farm; and warned by them from time to time by pre-arranged signals of the

movements of the dodging keeper, who would fain make up to him, he dodges in turn, and "blazes" away as he can till he is over his hunting ground and the game up for the time. Again, several neighbouring tenants engage a rabbit trapper, and set him to work, despite protests and threats as to the consequences from the game lessee. The trapper has the distinction of being closely followed by the keeper and *his master*, who manfully "spring" his traps as fast as he sets them, till a sturdy employer to whom the trapper complains goes up and gives the parties concerned a bit of his mind in pretty plain terms. The trapper goes on for the season. What he makes off the rabbits he is justifiably reticent in stating, "Was he paid anything?" Not likely. "In fact," says one of our informants, "I should have got something fae him for the privilege." It was shrewdly conjectured that off one farm he was making £3 to £4 a week at the height of his season; and, without doubt, his labours resulted in a good many heavy sackfuls of rabbits despatched to the game dealer's; his trapping being carried on, moreover, under the serious drawback of his being unable to follow the creatures freely into their fastnesses in the plantations.

"It's a great point their bein' disturbit, ye ken," says a shrewd out-spoken farmer, humourously alluding to the solemn admonitions of the keeper against the tenant's dog by chance going inside the wood; and we find that, as in all similar circumstances, cats have a remarkable tendency to disappear. The winged game are partridges and some pheasants. And last season, when the former got wild and the latter called "strong," the winged game were indeed a goodly sight. Various other birds were also seen, but the

long flight to sitting on the ground till closely pointed and handy for slaughter as they rose—a device was adopted by the keepers, which may be mentioned for general edification. It was that of flying a kite overhead, and in advance, which the witless "pairtricks" mistaking for a bird of prey, pressed to the ground till compelled to rise and be shot at!

The lessee of the shooting in this case, as in not a few others, sends the result of his exertions directly to market in considerable quantities. Looking at the comparatively small sum at which the shooting is valued (some £70) compared with the undoubted damage which the tenants sustain—and any one who knows the least thing in the matter can judge for himself of the significance of broad patches of briard closely eaten down by the vermin in the middle of June, or of finding a few of the obnoxious wretches impudently nibbling away in the corner of a field at noon-day, even, as we did, here and there—there can be no question that it would be a much easier burden for the farmers to make up the game rent amongst them, and let a trapper have unimpeded control of the vermin.

On the whole, our decided conviction, judging mainly by what we saw with our own eyes in a case that can by no means be called extreme, is that the damage sustained by the tenant-farmer, in a great many instances little heard of in public, or not heard of at all, is so serious that were proprietors, setting game-keeping opinions aside, simply to look at it in detail with unprejudiced eyes, as we did, those of them who possess a fair share of good feeling and common sense would not hesitate for a day to put hares and rabbits at least, completely under the control of the tenant.

AGRICULTURAL PIECE-WORK AND CATTLE DISEASE LEGISLATION.

he distribution of prizes to deserving labourers, at the meeting of the Blo-alsham, and Flegg Agricultural As-ly, Mr C. S. Read, M.P., made some in reference to piece work in agri-

At the dinner of the same Society upon the working of the Contagious (Animals) Act. Both speeches read with interest by farmers.

impossible, in these days, he said, about wages to the men, without to the strikes that have taken place, unions that have been formed through-country. My advice to you is to ourselves independent, not to barter our independence to unions. Keep es thoroughly independent, and make n bargains. You all know that when a union, you must abide by the laws s of that union, and you are no longer dent men. Why, those of us who mbarked in the matrimonial union at, in a measure, our independence (laughter)—and I assure you, that in this Labourers' Union, you will you are bound hand and foot, so cannot stir. The unions must be because they begin on wrong prin- They begin by saying that all men d, and entitled to the same pay. Now w that is wrong, because here you led labourers, all of you with good rs, and proving by your skill, your , and by your sobriety, that you are an some of those who are left behind. mean to say that there are not as t at home, but you have proved your- perior to some. Then how are you ve your condition? I admit that you nothing to complain of—we all have ng to complain of, whatever our station ay be—but I believe you may im- ur condition, each of you, by your OL. IX.

own exertions. I will tell you one way— by having more piece-work and less day-work. Try this. If you ask your masters for piece-work, I will engage to say that in nine cases out of ten it will be granted, and then you will find out who is the best man amongst you, for the best man will earn most wages. By the general adoption of day-work we have come to this—we have, in a great measure, brought the best labourers down to the level of the worst. Let me illustrate what I mean. Suppose one of you men who have received a prize for ploughing to-day—of course you are good hands, and you are superior in a great measure to the rest of those with whom you work—go to-morrow and work with three others, two of whom we call middling hands, and one a lazy, good-for-nothing fellow—what do you do? You will in all probability think that this fellow is a nuisance to you and to the farmer, but you will say, "It's no business of mine; I shall get my day's pay if I do my work, and so will he even if he doesn't do a fair day's work." And the result is, that although you may be the best-intentioned man in the world, if you are associated with those lazy fellows, and those good-for nothing ones, you gradually come to this—instead of your bringing those men up to your level, and improving them, and making them good labourers, you are by degrees imperceptibly drawn down to their level. For instance, if you are associated with one of these men, instead of ploughing, as you might very well do, an acre of land in a day, you will plough just as much as he will. And then you wonder that the master don't increase the rate of day pay. "But," you will say, "there are a great many things on a farm that can't be put out by piece," and perhaps you will say that ploughing is one. Now, I know a great many instances in which men are paid

D D

by the week for looking after the horses and taking care of them, and paid by the acre for ploughing. What is the result? We will take the same case I have mentioned. You go into the field to-morrow morning ploughing by the acre, and you have those two middling fellows and the lazy one. Won't you put the whip over his back if he won't stir quicker? You won't let him plough only part of an acre when he might plough a whole one. You won't let him dawdle away his time. You won't let him sit under the fence to smoke his pipe because it happens to rain a little as it does to-day. You won't allow him three minutes to turn round a headland when he can do it in one. If you chance now to go to the public-house on Saturday night to have your half-pint, you will be sure to meet him there—he is very slow to work, but he is very fast to drink—and he will turn the laugh against you about what you have done; but if you work by the piece, and not by the day, you will have the laugh against him, because in the end, instead of his getting 12s. a week, if he does not quicken his pace and improve in his habits, he will get only 9s., whilst you will be able to earn your 15s. and perhaps 16s. a week. I say, then, to all you men coming here as you do with superior character, and having shewn by your skill that you are better labourers than many of your class, ask your masters for piece work, and I am sure that they will grant it wherever they can. By that means the farmer won't pay any more per acre than he does now, and the best labourers will earn ever so much more, and the indifferent and lazy ones and the stupid fellows must come up to your level, or else they will only get what they earn, and that is a precious little. There is no doubt that the best of you will be able to do a great deal more than you are doing now, and you will be able to do it for less money than you are doing now. I like it very much, and I shall be glad to see every abouring man

shall have a pint of good wholesome beer for his dinner; but don't spend at the public-house all the spare cash that you have. You must be provident, and take care of the future, and, therefore, I say to you, young men, let it be your first object and your first duty to provide against the day of trouble and sickness, which is sure, sooner or later, to come to all of us.

At the dinner Mr Read said:—Probably some of you may remember that last year, when I mooted the question of the Contagious Diseases (Animals) Act in the House of Commons, I said it was time we should have a committee to inquire into its action, but the Government were kind enough to allow the House to be counted out; why they did so I don't know, but perhaps they did not like the subject, or, possibly, because they might have had an adverse division. But I am happy to say that Mr Forster now sees the necessity of having an inquiry into the subject, and has promised me a committee next year. But I want to know whether you practical farmers do not think that the Contagious Diseases (Animals) Act has been a perfect failure in this district. The operations of the Act, as far as regards pleuro-pneumonia and foot-and-mouth disease, certainly inflict upon owners of stock an immense amount of injury, and to all appearance do no good whatever. We have now in this country an amount of foot-and-mouth disease such as we never had before. I find that during the last twelve months we have had in this country no fewer than 1061 cases of pleuro-pneumonia, of which 734 have been reported during the last three months. We have also had during the last twelve months no fewer than 191,000 cases of foot-and-mouth disease, 131,000 of which occurred during the past three months. Therefore we seem to be getting from bad to worse. Let us hope the tide is turning, not from preventive action of this Act of Parliament, but from natural causes. Only think of 191,000 cases of foot-and-mouth disease! What a loss that is to the country. Take it at only 10s. a head—for of course there are a great number of sheep—and

it gives a total loss of £95,000 in the first instance to owners of stock, and in the second place to the consumers. Yet some people say that the Act is no sort of hardship or oppression to the owners of stock! Some of you, however, must have found that it is so. How curious and perverse is the Act with regard to pleuro-pneumonia! You may take a bullock in the last stage of disease and walk him to the nearest slaughter-house; but bullocks that have been herded with the unfortunate animal, that are perishing in a marsh, and that may be perfectly sound, cannot according to the strict letter of the law be moved. Then take the case of foot-and-mouth disease. Mr Veterinary-Surgeon Smith, when he sees going upon the hill two or three cattle affected with it, immediately stops and removes them, but he cannot detain the remainder. Is there any act so stupid as this? It really disseminates the disease, and does nothing that I can see towards preventing it, except that it imposes certain fines and penalties upon a few unfortunate owners of stock. With a law like this those who have to administer it really do not know what to do. Now and then a man is brought up and convicted in a very heavy penalty—and for what? We find that one gentleman who had not given notice that his cattle were suffering from foot-and-mouth disease was fined £51, that another for not giving notice respecting two diseased

bullocks was fined £15, that another for not returning 78 sheep that were diseased was fined £26, and that another who neglected to give notice of six affected cattle was fined £30. A man in North Norfolk, who had a large flock that were starving, moved them for some distance along the road, as he was almost bound to do, was fined £40. It is all very well for gentlemen at the Quarter Sessions—as a noble lord did—to say that if you do not enforce the Act rigorously, you cannot expect it to do any good. But the cases I have quoted shew excessive severity. It would be much better to inflict a nominal fine for an offence which, after all, if it is an offence, is so slight a one that it might almost be passed over, because when notice is given to the police, the policeman tells the inspector, and there it ends, for no further action is taken. Instead of that, in my opinion, the man who has disease upon his farm ought to give notice of it to his neighbours, who are the people most interested. If there had been a clause passed, as I suggested, providing that a man should tell his neighbours, and not the policeman or inspector, it would have done a great deal of good. I therefore think that you will agree with me that the time has arrived when we want at least an inquiry into the action of this Act of Parliament, and also as to whether the whole of our legislation, as far as regards our cattle, cannot be improved and modified.

GERMAN AGRICULTURAL LABOURERS.

A CORRESPONDENT of the *Scotsman* gives an account of the condition of the agricultural labourers in Germany. He says:—

A very large proportion of the German peasantry are indeed in a much better condition than those in Britain are, or are likely to be, for a great part of the land is possessed and cultivated by the peasantry themselves. In the meantime I will speak more

particularly in reference to those known in England as agricultural labourers, those that are dependent upon other people for employment. In many respects they are far in advance of the British agricultural labourers, alike politically and socially. There is here no obnoxious distinction of rights and privileges between country and town. The same universal suffrage exists in both. But a right which he values more than that of a voice in

national government, is that of acquiring a piece of land of his own. He has the disadvantage of a less thorough education than the urban workman, but his duties are also of a simpler nature; and he always learns at least to read, write, and cast up sums, and to "fear God and honour the king;" so that his education is equal at least to the best that is to be obtained in England, Scotland, or any average agricultural district. In social life the German Bauer's manners are consistent with his humble station in life. He is less sceptical than the native of the town, and shews great reverence and respect towards his superiors. On meeting a stranger in the public road he generally lifts his hat and salutes him with a "Guten Morgen" or "Guten Tag." He still maintains a reverence for the church and for religion, in contra-distinction to the "Gottlosigkeit" (godlessness) of the civic population, and conducts himself like a God-fearing man. He eats the simplest food, and it is seldom that either beef or mutton comes on his table. By far the greater part of the German population being engaged in agricultural pursuits, the comparatively small consumption of animal food in Germany to that in England is thus explained, for, from what I have seen, the town's people eat quite as much animal food here as in Britain. It is a notorious fact that the German peasant, from motives of frugality, seldom tastes animal meat, living almost entirely upon vegetable food. He, however, in common with the whole race, is very fond of coffee. A very characteristic strike of farm labourers was reported some time ago from Bavaria, in an agricultural newspaper, in which coffee instead of sour milk to breakfast was demanded. Their dress is also of a plain nature, but I have never seen, either in town or country, a single ragged person of either sex of the class, and on Sundays, if not engaged in working, he comes abroad in very decent and substantial garments. The women, however, who are largely engaged in out-door agricultural work, are, I think, scarcely so well clad as those engaged in the soil of Scotland.

similarly employed. Their dresses are generally of a blue-spotted gingham; as regards length, made with the greatest view to economy of cloth; and for the larger part of the year they dispense with boots and stockings, and wear no other superfluous encumbrances to the free use of their limbs. Their dwellings are of plain brick, but neat and clean, and almost always covered with vines and surrounded with neatly-kept gardens, all shewing industry and frugality, and bearing an air of comparative comfort about them. Indeed, a more frugal, saving, industrious, and generally well-behaved class of people could not be found anywhere. They do not taste spirits, and though, of course, they swill considerable quantities of their famous Lager beer, it never seems to take any effect upon their equilibrium.

The whole of Germany, however, stands in a bad position as regards illegitimacy. In Prussia, which occupies the best position in this respect, the proportion of illegitimate to legitimate births is scarcely one to twelve, which, too, varies very much in different districts, according to the social conditions peculiar to them. In Saxony the proportion is one illegitimate to something more than six legitimate births. In Mecklenburg, owing to repressive marriage laws, and other bad social and political conditions, the amount of illegitimacy is greatest, being throughout the whole country, in the year 1864, at the rate of nearly one to three, but varying very much in different districts. In some districts a third, in others a half, and in not a few the whole of the births were illegitimate. And this is a Protestant country! Bavaria is also in a bad condition, but since the amendment of the marriage laws, it has shewn a steady improvement. This is the greatest blot upon the German character.

As regards wages, he is indeed never burdened with an over supply of money, but on account of the large emigration, the demand for his labour is now great enough to enable him to make a fair bargain with his employer; and he too, like everybody else in Germany, has recently had an increase to the remuneration for his labour. A farmer in the neigh-

bourhood of Leipzig, who cultivates land belonging to the town, told me that he paid his female labourers at the rate of 10 groschen (1s.) per day, and his male ones at 22 groschen (nearly 2s. 2½d.). This, however, does not seem to be the case throughout the whole of Germany. Wages are not always paid in money, there being what is called "Natural" and "Geldlohnung," the former meaning that, like the hinds and shepherds in Scotland, they are partly paid with other materials, though the tendency of the present day is towards the abolishing of this system, and the adoption of a pure money bargain, and this according to the wish of the employers, and not of the employed. In the old provinces of Prussia there were employed of the two classes—namely, *Gesinde* (people engaged yearly, who live in the employer's establishment), and *Tagelohnern* (those engaged for short periods, and paid at so much a-day, but living entirely apart from the premises of the employer).

In Fuhling's *Landwirthschaftliche Zeitung*, part 12, 1867, a model method of payment

was given, and which at the time was considered high. It was for the *Gesinde*, and was as follows:—For January, February, November, and December, two thalers each, as these are the months in which least can be done; March and October, four thalers each; April and September, five each; May and June, six each; and July and August, seven each; and at the end of the year's service eight thalers premium—so that in all sixty thalers (£9) forms, in the estimation of the German people, a good payment for this class of work. The master can lay on a fine for any misdemeanour according to his own judgment, but it must go into the *Gesindekasse* (servants' bank) for the benefit of the whole of them. A servant can give notice to leave at any time, but must leave within twenty-four hours, and can lay claim to no more money than for the last complete month. They can, however, from this save money, some to take them over to America, others to obtain a piece of land to cultivate for themselves, or to lay in store against a feeble old age.

COMPENSATION FOR UNEXHAUSTED IMPROVEMENTS.

THE discussions at the Farmers' Club and the Central Chamber of Agriculture, on the question of Tenant-Right, have brought out a good many arguments on both sides of the controversy, a considerable amount of inconsistency, and a superabundance of talk which has, in not a few cases, been of no value whatever, but which, on the contrary, has tended to consume hours of valuable time. Comparisons, we are told are odious, and were we to institute a comparison between the proceedings of the Farmers' Club and the Central Chamber, we feel certain that it would not be particularly advantageous to the latter body. At the very outset of the discussion a mistake was made which might have landed the Chamber in, to say the least, an awkward position;

and although mistakes, we are sorry to say, are not "few and far between" at meetings of that body, still, in connexion with this subject, they have a somewhat more important bearing than is generally the rule. Putting aside altogether the repudiation of Mr Long and Mr Read, the respective proposer and seconder of the resolution adopted at the last meeting of the Chamber in the summer as not being the resolution agreed upon at that time in consequence of a clerical blunder, it was rather amusing to observe the resolute determination depicted on the faces of the chairman and members when Mr Long rose to propose an amendment to the resolution advanced by the Business Committee. Mr Long succeeded in finding a seconder to such an amendment—which was to the effect that

the outgoing tenant at the expiration of his tenancy should be entitled by legislative enactment to compensation from the landlord or incoming tenant, for the value of his unexhausted improvements—and after several members had stated their views upon it more or less favourably, Sir John Pakington came to rescue them from their dilemma. "I should be very sorry indeed," he said somewhat sarcastically, we fancy, being a business man, "to add to the difficulty that is inherent in the subject, but I merely want to raise a question as to the usual mode of proceeding of this Chamber, because it appears to me that the course which has been taken with reference to this amendment involves us as a matter of business in very considerable difficulty. At the last meeting in the summer the resolution, which has been put by the chairman, was discussed. Mr Long then moved an amendment, which was seconded by Mr Read. We now assemble together after an interval of four months to continue the discussion, when we are told that Mr Read withdraws his approval of the amendment, and further that Mr Long withdraws the amendment altogether. It is very true that the amendment touches the great question; but we cannot be too cautious, and I do think that we ought not to adopt or reject an amendment we have not had the advantage of seeing in print before." The calm, dignified censure of Sir John had the effect of eliciting various "hears" from all parts of the room, and it was decided that the amendment should be withdrawn and discussed afterwards. Thus more than an hour was consumed, and the Chamber had done nothing upon the subject they had met to consider. Proceeding in a more formal manner, however, Mr Carrington Smith then laid the following amendment before the meeting,

"That it is desirable to introduce into Parliament a bill entitled 'The Landlords' and Tenants' Property Bill;' such bill to enact that on the expiration of a tenancy the landlord may claim, under an arbitration board, the amount due to him for dilapidation by default of the tenant, or the tenant may claim, in like manner, for unexhausted improvements resulting from his occupation.

On this motion the most important discussion of the day took place.

Few of the speeches were distinguished by any originality of thought or argument, but such a want cannot of course be found fault with. The subject has been under the consideration of almost every local chamber of agriculture in the kingdom during the past three months, and the *pros* and *cons* are pretty well known by agriculturists as well as the general public. Although there were some among the speakers who seemed to deprecate, from reasons of their own which they did not think proper to lucidly explain, the interference of the legislature in the question of tenant-right, the majority of tenant-farmers, as well as several landlords, were in favour of a measure on the subject being introduced into the House of Commons. Although custom, like the Lincolnshire tenant-right, is a very good thing, yet, as Mr. Read affirmed, it was of slow growth; and immediate security of capital and freedom of cultivation are essentially necessary to the farmer, if it be desired, as it is, that the soil should yield the utmost it is capable of bringing forth.

One gentleman, in a vain attempt to refute Mr Read's assertion as to the tardiness attending the general recognition of custom, gave utterance to this wondrous truism, "that with regard to the slow growth of custom, he thought the moment it was established, there it was; the moment a custom was initiated, it became a custom." The audience, hardly appreciating the profundity of the remark, burst into irreverent and voracious laughter.

However, with regard to an enactment which shall as soon as possible give security to the tenant against an unprincipled landlord, and at the same time protect the owner against tenants whose ideas as to justice are not the most evenly balanced, there are many difficulties which beset the path of the legislator. As Sir Michael Beach pointed out, there are many counties (too many, perhaps) where no compensation whatever is allowed, and many where custom secures compensation to the outgoing or incoming

t; there are some places where only a y of the capital left upon the farm is led such as in Norfolk, where hay and os only are taken into consideration by undlord. Again circumstances differ so in different counties, that what might a improvement in Lincolnshire, might actly the opposite in any other county ferent soil, and perhaps climate. How are all these multiplicity of customs to et?

ere can be no doubt that a Tenant-Right must be to a great extent a Landlord's : Bill also. There are many short- d landlords who do not seem to nize the fact that to award compensa- for unexhausted improvements to the ing tenant is tantamount to receiving a r rent from the incoming man. Sup- g a farmer has received notice to quit, s given notice that he will quit, one or years, or, perhaps, even three or four, e the expiry of his lease, it is, as was ved at the Farmers' Club, "contrary to n nature" for that farmer to lay out as money during these last years as he any of the preceding years of his lease. owever, he received any assurance that oney he had expended during the last or two would be recouped to him, he l have no fear, in the face of a valuation s going out, to maintain the farm in degree of fertility which it was in dur- he years he had occupied it. It is o be supposed, however, that all land-

lords will see a Tenant-Right Bill from the same point of view, and it will therefore be necessary either to have a Committee of Enquiry upon the subject, or issue schedules to collect statistics as to local usages. A Committee of Enquiry, at which both land- lords and tenants would be represented, has been spoken of; but after the experience of the Aberdeen Game Conference, and looking at the differences of opinion existing, we should be afraid to hope much from such a body. We would prefer to rely more upon the Bill which Mr Howard has proposed to draw up.

The remarks of Sir John Pakington were highly sensible and worthy of consideration. He declared that it was just, sound, and politic, that in these days of improved farm- ing, the agriculturist should be enabled to lay out his capital with due and fair security, and that any owner who resisted the establish- ment of the principle of security was blind to his own interests. He saw no objection why the legislature should not be asked to enact such a principle. Of course interferences with the freedom of contract should be care- fully guarded against. Mr Smith urged his motion in spite of the solicitations expressed by many members to withdraw it, and the result was that it was negatived by a majority of 12—29 voting against and 17 for it.

The avoidance of detail was effectually carried out in the resolution adopted which affirms the "grand principle of compensation for unexhausted improvements."

MINNESOTA AS A FIELD FOR FARMERS.

[By Our Special Correspondent.]

NO. I.

as been asserted by a certain class of political writers that it is a delusion to think that the people are emigrating because there is not room for them in their land, and that their departure is a relief to those who remain behind; but it will not be difficult to prove the fallacy of these assertions, were it necessary to do so. Content at present with saying that the resources of our country are now such as to press the subject of emigration on the minds of all classes of the people, in a way scarcely ever done before, and especially our agriculturists. In our little island we are terribly cooped up together; the stern conflict for bread, the weak constantly pushed to the wall. Our lands are rented, and it is no uncommon thing when a farm is to let, sixty applications in for it. I know a nobleman who some time ago 250 applications in hand for his first farm that should be to let on his own. Our farmers, too, if they would prosper, must annually expend on manure a sum very greatly exceeding their rents. Taxation, already oppressive, seems destined to increase rather than to be lessened; the population is rising fast, and the high prices of fuel and coal, together with the failure of the crop, are facts fitted to make all men seriously consider how it is possible to better their condition. Some men only tell us that we have plenty of land within our own borders which only need to be reclaimed in order to supply food and fuel for the people. But it is certain that all our waste lands, though they are cultivated—and vast sections of the uncultivable—their produce would not meet the necessities of the nation. Others tell us that if the present produce of our lands were all rightly used for food, as God

intended it to be; if there were no malting and distilling of the precious grain, there would be food enough and to spare in our land. But we question even then, whether the grain thus used and applied to its proper use, would long continue to meet the wants of such a rapidly increasing population. Certain it is that the event is yet far off; a possibility, no doubt, but hardly ever likely to become a reality, and we have to face, as best we can, the stern facts of the present. These seem to teach us in unmistakable language that we need more breathing room, and ampler spheres in which to expend our energies and secure proportionate rewards. We need more land to cultivate, and that land in the possession of more hands; for here the land is falling into fewer and fewer hands, and the large farmers are extinguishing the small; so that the enriching of the few is the impoverishing of the many. We have not sufficient produce to feed our people, notwithstanding all our high farming. That is manifest from the continual stream of imports flowing into our country from other shores, without which we could not live. And since we cannot find within our sea-girt isle the land we so much require, and which is so eagerly sought after by so many men, it becomes a pressing practical question, where can it be had? what part of the world would suit our population best? and on what terms can the desired land be secured? Questions such as these are now stirring the minds of multitudes in this and many other countries; and never were so many persons taking practical steps to get them solved. They feel the truth of the words uttered by the *Times*, when it lately declared that it is a delusion and a snare to pitch one's tent anywhere in England in search of cheaper living; and recommended as the only effectual remedy for an

evil which is growing yearly worse, removal to "other regions where the resources of nature, her open spaces, and her fertility are far ahead of human industry." But where shall we go? The fields are many and inviting, and from all of them there seems wafted to our shores the appeal, "Come and replenish the earth and subdue it, for long has it here been waiting for your advent, the skill of your brain and the toil of your hands, and rich are the harvests with which it will reward your toil." Each field has its own special excellences and attractions, and each has its own peculiar drawbacks, for Paradise has disappeared from earth since Adam left his Eden home. It becomes, then, a difficult and delicate matter for a man to decide between the rival claims of so many fields, and it would be presumptuous for any one to assert that the particular land which he favours is pre-eminently the best for emigrants indiscriminately. The quality of the sphere largely depends upon the character, wants, talents, tastes, and aptitudes of the emigrant; and, therefore in regard to all details which meet his peculiar case, each man must judge for himself. In coming to such a decision, however, one may be of considerable service to his fellows by giving them the newest, fullest and most reliable information regarding those parts of the world with which he is most familiar, and which in his judgment afford the outlets for the development of talent, industry and capital which an old and densely populated country like ours so much requires. In the hope of being able to guide some who may be on the outlook for a new field of life and labour, I have made a wise and profitable selection, I shall now present you leaders an account of my vision of the North-West what I have seen.

The first thing I saw was a great trail about
the mouth of the Winnipeg River flowing north.
The trail led me to a place where it was suggested to me that
I might take some part in organizing a colony

to settle there. Before deciding, however, to take part in such a responsible enterprise, in the exercise of that caution for which we Scots are proverbial, I resolved to go out and see the land for myself, and bring back a faithful report on the subject. In due time arrangements were completed; and, after a pleasant run across the Atlantic, along the Grand Trunk Railway of Canada, and up through Lakes Huron and Superior, I landed at Duluth, which is at present the eastern terminus of the Northern Pacific Railway, and so found myself in Minnesota. This state is only fourteen years old, and already is one of the greatest illustrations of American enterprise. It extends from Lake Superior on the east to the Red River on the west; and varies in breadth from 250 to 350 miles; while it stretches from Manitoba on the north to Iowa on the south, a distance of nearly 400 miles. The extent of country thus embraced numbers, it is said, as many square miles as New England and New York combined. My expectations had been considerably excited by the descriptions which I had read of the country, its healthiness, beauty, and fertility; but they were somewhat damped by a pamphlet which was put into my hands as soon as I landed in Canada, which denounced in no measured terms the glowing descriptions which have been given of Minnesota, its climate, and capabilities; calling them "United States' lies," and declaring that "farming in Minnesota is niggering of the worst description." I found out afterwards that this was only a specimen of the bitter jealousy cherished by the Canadians against the States. Indeed they are perfectly engaged to witness such an exodus of people from Britain passing beyond their dominion to the States; and are doing everything in their power to prevent its continuance, and this pamphlet was one of the means employed for that purpose. But it will not succeed, the fact that the largest proportion of emigrants who have left our shores for many years have passed by Canada and gone into the States, is proof positive that there is something more attractive for them there. In 1866 the number who went to the Colonies

,255; while those who went to the were 161,000, and still the great manifest the same preference. It is ean of the Canadians to try to pull down neighbour's house because it happens larger and better furnished than theirs. quite struck, in passing along the rivers kes which divide the two countries in places, especially with the appearance villages and scattered settlements on posite shores; there was such a con- etween them in regard to all the out- signs of industry and energy, of taste liness, and general prosperity, and the it was all in favour of the American side. pite of that pamphlet and the preju- hich it was fitted to excite in the mind itish stranger, I persisted in my pur- o visit and survey the land which it ugely denounced, being convinced, on on, that the author had overdone him- d his work; and that some key would nd to explain the bitterness of his nd the rabidness of his style. That d turn up, and before I close I may t it to your readers. The reading of duction, however, deepened the im- n already felt, that in giving my e testimony on such a subject I should eavy responsibility. I shall endea- erefore, to give a simple, honest state- of my own observations, and of the as of several very competent and reli- tnesses with whom I conversed, neither ishing on the one hand, nor disparag- the other, so that your readers may fair view of both sides of the picture, us be in some measure enabled to form elligent opinion of their own. Three farmers who went over with me in the fter a summer trip to their native land, whom had been in Illinois for seven- ears, and two of whom had been in asin for thirty years, unitedly expressed onviction that I was sure to return good report of Minnesota; and on ole I think that such is the case.

egard to Duluth, I confess that at first is I landed from the steamer, I felt hat disappointed; but as I drove all

over the city and viewed its plan and propor- tions, its evident signs of enterprise and pros- perity, its many fine shops and stores, and its nine churches; and looked down from the hill side on which it stands commanding one of the noblest views of a beautiful bay and the far-stretching lake, the disappoint- ment vanished, and surprise and admiration took its place. I can hardly imagine a finer site for a city; and have seldom if ever witnessed such a beautiful scene as that which lay before me when I stood on the height above the city. It is a well-planned city, and its main street extends two miles in length, and is already well studded with buildings. Its piers and docks are great works of art; and a large shipping trade chiefly in grain, is already being carried on; and it is expected that ere long in this respect, as well as others, Duluth will prove a formidable rival to Chicago. I was proud to find that it was a Mr Hunter, a countryman, from Perth, who built the first store there; and though he was laughed at for his folly, he was a far- seeing man, and the fact that such a city with a population of 5000 has sprung up around him in three years proves it. He is evidently making a fortune, and lives in a very handsome villa called "Lorne House." The foreman of a dredging machine at Duluth told me that he earned 150 dollars a month and his board; and that the ordinary labourers get 2½ dollars a-day. On Satur- day night I was in a store when several mechanics came in, apparently to get their week's wages. The employer asked one how much money he wanted, and he answered, "10 dollars," which appeared to be only a portion of what was due to him. He asked another how much he wanted, and he said he wanted none; seemingly he had plenty on hand, and allowed his employer to retain his wages for that week. From this and other incidents I inferred that the workmen of all classes were very flush of money.

On viewing the position of Duluth, I had a feeling that, because it has no agricultural land behind it for a distance of 160 miles, because its lake navigation is frozen up for six months, and that during that time the

Canadian railways, and the most direct route to be opened up from the Pacific to the Atlantic *via* Quebec, the difficulty was dispelled. There seems no good reason why the early realization of the future greatness of Duluth should be delayed. Minnesota is destined to be the principal wheat-growing province of the North-west, and Duluth must be its great port.

THERE are few inventors whose lives and pursuits present as much that is fitted to excite interest in others as those of Mr Frederick Ransome, the successful inventor of artificial stone. For the long period of nearly thirty years he has been engaged in his earnest career as an inventor, and his life during that time has supplied abundant materials for a most interesting chapter in the "History of Inventions;" it has been a record of successful struggle with difficulties—of progress, step by step, to triumphs that cannot have been dreamt of, even by himself, at the outset of his career; such a record as applies to the lives of few indeed, of even the most eminent inventors.

a speciality with Mr Ransome, but he had that a knowledge of this science was indispensable to his success, and he had long and deeply studied it, and is now, we believe, an accomplished master of the mineralogical branch of the science. He was enabled to alter his combinations and to progress from time to time as increasing knowledge and experience dictated, till at length the excellent qualities of his production were recognized by the most eminent scientists of the day, and the demand for his artificial stones became so much extended, that his business was taken up by a company, and extensive works were erected at East Greenwich, to which the business was transferred. Mr Ransome continuing with the company, his knowledge was essential to its success as a mineralogical director.

The party, about 50 in number, composed of practical scientists, was able to appreciate alike the processes submitted for their inspection. A luncheon, attended by the manager of the works, Mr. A. Pye Smith, personally conducted his visitors over the works, supplying explicit explanations as to process and products.

Concerning the building in whi

ture of the patent stone is conducted does not need to be said. It is plain, tial, and of large extent. The works r the Thames, with which they have nication by a jetty and a tramway. time of our visit a large barge, laden ery fine sand, to be converted anon lid stone, was delivering cargo at the the sand being wheeled to the works, t is sifted, thoroughly dried, and then o cells ready for use. Passing into the uilding, we find that above the arched ork cells in which the sand is stored, s a series of capacious cylindrical that perform an important part in the y of the manufacture, being none an the boiling down of veritable flint locks." The flints are combined with n proportion of caustic soda, and the applied by steam under pressure of o lb. to 80 lb. per square inch. The t of the flint dissolved in caustic soda ate of soda, which constitutes the ing agent in the first stage of moulding one. When the contents of the rs have been dissolved it is drawn off, bjected to evaporation till it reaches a gravity of about 1.700, when it is for use; it contains about two-thirds and one-third soda. The glassy, semi-fluid is then mixed with a suit- oportion of the sifted and dried sand, er thorough incorporation in a pug e mixture is ready for the moulders, se benches it is conveyed, and by t can be fashioned into any desired Thus far, after being moulded, a stone n produced, capable of hardening by tion; but the silicate which binds r the particles of sand is *soluble*, and e in this state would not resist the of water. The most important step in some's progress, in which his chemical dge stood him in good stead, was the e adopted for converting the soluble of soda into an insoluble silicate of hich is accomplished by saturating lded stone in a solution of chloride of l. The chemical result of such satu- s a reciprocal action, the products of

which are an insoluble silicate of lime and chloride of sodium, or common salt; the one binds the particles together indissolubly, the other is removed, as it exudes to the surface, by copious washing.

It would occupy more space than you can spare to attempt an enumeration of the variety in character, uses, and destination of the productions of this establishment. Amongst other objects under the hands of the workmen, were the plain and the ornamental. In one place the material, plastic now, was being hard rammed upon a perforated iron table, into circular moulds that indicated the various sizes of grindstones in progress. When the ramming and top rolling is completed, the holes between the stones on the table are plugged, and air pumps applied to the masses remaining on the tables, by which the process of saturation with the chloride of calcium is greatly facilitated. In another place chimney pieces with beautifully sharp, delicate, enriched mouldings, were in progress; and in another, portions of a large fountain, destined for Jamaica. The details of this structure in separate pieces, consisting of dolphins, aquatic plants, shells, and other appropriate objects were exquisite specimens of design and skill in execution. In other parts of the works, flooring-tiles of different colours, and in their finished state of almost adamant hardness, were being rolled instead of rammed; and on other benches emery discs for saw-sharpeners were being rammed, and also rolled, and turned out of the moulds very deftly, by means of very ingenious yet simple appliances. These discs, which are a curious application of the Ransome process, are wonderful in performance. One of them about $\frac{1}{2}$ an inch thick, was shewn in action upon a file of about $\frac{1}{4}$ -inch thick, which it ground down as if it had been a piece of soft slate, while it operated until the file was red hot, and had a long thick train of brilliant sparks thrown from it, the disc itself remained so cool as to be touched with perfect impunity. We are informed that one of these discs $\frac{1}{4}$ -in. thick will attack a saw blade $\frac{1}{8}$ -in. thick and cut it at the rate of 6 inches per

minute! Notwithstanding their almost terrible effectiveness, these discs have in themselves marvellous powers of wear, working continuously at saw-mills for months, day after day, without giving out.

The few objects we have enumerated do not give an adequate idea of the capabilities of the process, or the uses to which the products may be applied. In store, besides these, are members of cornices, fountain basins and pillars, vases, cantilevers and trusses, mantlepieces, balusters that are admirable imitations of porphyry, granite, marble of various kinds and colours, all taking a polish as glossy and smooth as plate-glass. Among the most interesting objects in the collection was a number of admirable busts, "repeats," in Ransome stone, of the late Mr James Ransome, father of Mr Frederick, and one of the spirited founders of the Orwell Works firm.

The filters, manufactured from a particular porous mixture, are an ingenious, simple, and effective contrivance. They are of various sizes, and are simply stone cylinders, stone round, and closed with the same material at the ends. They are placed simply at the bottom of the cistern or vessel, the contents of which they are required to filter. A pipe passes from the inside of the filter, at its top, to above the surface of the water in the cistern. By this the air, displaced as the water percolates into the filter, is allowed to escape. Another pipe, from the bottom of the filter, and passing to the outside of the cistern, affords means for drawing off the filtered water as required. They are equal to 100 gallons per day for every square foot of filter surface.

One of the most recent applications of the process is in the manufacture of coffer dams

and other hydraulic works. For these purposes a different combination of material is employed.

The power of resistance to crushing weight of this stone is 7.145 lb. per square inch; Bramley Fall, 5.120; Portland, 2.630; granite, from 8.000 to 12.000.

The applicability of the stone caissons to hydraulic works has already been tested successfully at the Hermitage Wharf, where stone caissons, made at the works, have been sunk down to the London clay—a depth of 14 feet below low-water mark. The work was sunk in sections of about 3 feet 7 inches deep, which had tongued joints. It is 9 feet diameter, and the wall 9 inches thick. Its cost is computed by disinterested parties at less than half that of cast iron. By the adoption of Ransome's caissons for works founded under water it is evident that a great saving will be effected; as all preliminary and temporary works will be dispensed with.

A number of the past Presidents and Vice-Presidents of the Society of Engineers were present in this visit of inspection, and at its termination, Mr J. H. Adams, Vice-President, in the name of the Society, expressed to Mr Ransome the deep interest that had been awakened by all that they had heard and seen.

Mr Ransome replied that nothing gave him greater pleasure than to facilitate the investigations of practical and scientific men, from whom they had no secrets to conceal, but to whom they were ever ready to communicate the fullest particulars, partly with the interested view, it might be, of preventing all after questions as to priority of invention.

The party was under the guidance of Mr Perry F. Nursey, the Secretary of the Society of Engineers.

Agricultural Implements and Machines

ALTERING WILD AND CHECKING VICIOUS HORSES.

often found difficult to halter uncolts even when they are in the following cut (fig. 1) is illustrative has, according to the *Rural New* often been done very successfully:— a light pole, ten or twelve feet as long as you can handle to ad-drive two nails into it about eight art; the first about an inch from



Fig. 1.

f the pole, with the heads bent a ard from each other. Then take a rope halter with a running noose, art which slips through the noose at two feet and hang the part that the head upon the pole between keeping hold of the hitching part, st be as long as the pole. alter is now so spread and hung stick as to be easily put on to the the colt is not excited or fright- ou extend the halter towards him, ch out his nose to smell and ex- and while he is thus gratifying his you can bring the slack part jaw, and raise the pole high bring the halter over and back s, when, by turning the stick half

way round, the halter will drop from it upon the head. This will frighten the colt a little and cause him to run from you; but this will cause the slack part passing back of the jaw to be tightened, and the colt will thus be secured."

The shoeing of vicious horses is often found by the farrier anything but a safe operation. We have frequently seen animals lunge out very savagely, to the imminent danger not only of the operator but of casual standers-by. The following (fig. 2) engraving represents a rack which effectually prevents the most ill-tempered animal from injuring itself or those about it.

The animal is led into the frame, and secured by hooking the harness to the hooks. A forefoot is taken up and secured by the strap to the post seen at the front. Bars with bands passing beneath the horse, are placed on each side, which may be elevated until the beast is lifted off its feet and rendered perfectly helpless, if needed. The

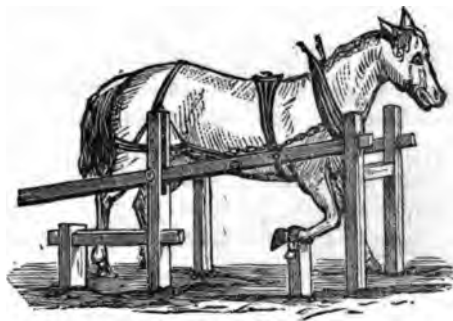


Fig. 2.

hind feet may be fastened to the hind-posts by straps, in case of a very vicious animal, and the shoes nailed on while the blacksmith is protected against any attempts at kicking, and the beast cannot throw himself, being supported by the frame and belly-bands.

The rack should be made with stout sills and posts, about 4 in. square, or sufficiently strong to resist the struggling of any animal that may be put into it, and mortised into

them. The size of the frame should be adapted to the animals for which it is provided—about 8 ft. in length and 2 ft. in width.

BREAD AND SUGAR GRINDER, &c.

FOR many years Mr Hancock's name has been before the public as an inventor of machines calculated to effect saving of labour and economy in domestic arrangements. His butter machine, brought into notice some dozen years ago, still continues to be recognized as a very valuable adjunct to the necessary household utensils.

latest invention is a machine without any definite name. It is vaguely designated "a novelty of great household utility." Having seen it disintegrating portions of a fresh loaf, browned crusts, biscuits and ginger—the latter of which, as our readers are aware, is a very fibrous commodity—we are persuaded that it will be capable of doing the rest of



Bread and Sugar Grinder.

It has the highest approbation that can be bestowed upon it, viz., it has for a patronizer one whom the poet designates "the first lady in the land"—Her Majesty the Queen. In many an humble household it has made what was previously unpalatable, fresh and palatable. Mr Hancock's

the work the inventor claims it can do, the powdering of sugar and the grinding of coffee. The movement is easy; in the working parts there is no complication of nuts or screws, and no corners where dust might lodge. It is a thoroughly useful machine in the household.

Our Pasture Grasses.

FESTUCA HETEROPHYLLA (A. E. Jussieu and D. Villars)—VARIOUS LEAVED FESCUE-GRASS.

SYNONYMS.—*F. nemorum*, *F. ovina herdisformas*, of some authors. French, *La fetuke feuilles variées*. Woodland hard-fescue.

DESCRIPTION.

PERENNIAL, roots strictly fibrous, and never spreading underground. Habit of growth, densely tufted, compact, and upright; leaves of a light green colour, those next the root filiform, or finely cylindrical, long, and flexible, while the stem leaves are much broader than in the allied species, *F. duriuscula*; stems numerous, very upright, and from $2\frac{1}{2}$ to 3 feet in height; panicles loose, long, slightly spreading, and bending to one side; spikelets, open and spreading each containing about 5 prominently bristle-pointed seeds; flowering in the second or third week of June, and ripening its seed about a month afterwards.

NATURAL DISTRIBUTION.

This is not a British grass, although common in the central and southern countries of Europe, where it is most frequent in moderately shaded woodlands, at low or intermediate elevations, on soils of good quality and free from stagnant moisture.

QUALITY AND USES.

Throughout the first half of the grass growing season, this is the most productive of the so-called fine-leaved fescues, both in pasturage and hay; but it does not reproduce its flower stems; and the autumn growth of its root leaves is also deficient, hence it has never been extensively cultivated in Britain. Although it deserves a place in hay and pasture mixtures, where heavy first crops are desiderated, more especially in those pastures

VOL. IX.

of ornamental lawns which are over-shaded by trees. Its tufted habit of growth precludes it from being used in fine scythe-kept greens, yet few grasses are more suitable for woodland rides and drives that are less frequently mown, while for narrow, ornamental walks and parterre edgings, its close non-spreading growth, and agreeable light green colour, render it remarkably suitable as exemplified in His Royal Highness the Prince of Wales' gardens at Sandringham.

SEED AND SOWING.

This fescue is remarkably prolific in the production of seeds, the average weight of which is 12 lb. per bushel, and about 33,000

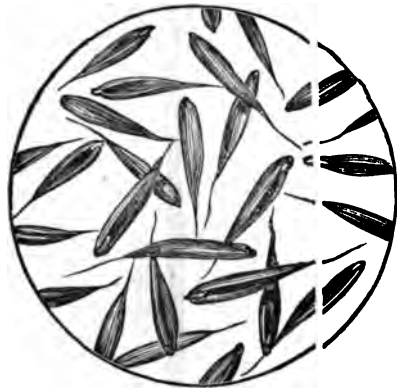


Fig. 1.—Seed magnified three diameters.

of them is contained in one ounce. The greatest number braird when covered with not more than $\frac{1}{4}$ inch of earth, one half that number when the covering is 1 to $1\frac{1}{4}$ inch in eph, and none came up when buried to a

E E



F.—*Festuca heterophylla*—natural size.

depth of $2\frac{1}{2}$ inches. If sown for an exclusive crop, its close-tufted habit of growth would necessitate at least 36 lb. or 3 bushels of seed per acre, but 2 or 3 lb. per acre would

CHEMICAL ANALYSIS.

As the *F. heterophylla* is not included among either of the collections of grasses experimented upon in the Woburn Grass Garden,



Fig. 3.—Shewing habit of growth.

be sufficient for permanent pasture mixture, and three to five times that weight might be used in woodland rides, or under the shade of park trees.

nor at Cirencester Agricultural College, we have no record of its analysis, but that may be safely taken as being nearly allied to *Festuca duriuscula*.

The Farm.

IMPORT AND EXPORT OF AGRICULTURAL COMMODITIES.

THE Trade and Navigation Accounts for the month and ten months ended October of this year have just been issued. Recent discussions about tenant-right and unexhausted improvements shew that these dry figures are assuming an interest which to many farmers they never possessed before. We have, therefore, all the greater pleasure in summarizing them—in giving in as readable a form as possible the information which these statistics supply with reference to articles and commodities, the special products of agricultural industry.

Following the alphabetical arrangement of the tables, we find that alike on the month and ten months there has been a very great decrease in the importation of foreign cattle. Taking oxen, bulls, and cows together, we notice that in the ten months we imported only 127,340 animals, as against 182,568. The amount of money disbursed this year up to the end of the month noted was £2,333,759, up to the end of last October it exceeded £3,000,000. In the month the decrease was more marked, the number of bulls and cows received amounting to only 15,333; in the October of '87 no fewer than 25,827 were landed. The latter number 10,648 were landed in the month of this year or 10,648 less than in the month of last year. The number of sheep imported in the month was 1,465,141, as against 1,465,141 in the month of last year. The number of pigs imported in the month was 1,465,141, as against 1,465,141 in the month of last year. The number of poultry imported in the month was 1,465,141, as against 1,465,141 in the month of last year. The number of other agricultural commodities imported in the month was 1,465,141, as against 1,465,141 in the month of last year.

period of last year. The imports of the porcine race are growing so "small by degrees and beautifully less," that on first sight it would seem no extravagant supposition to a foreigner that Englishmen were rapidly adopting the Jewish faith, did not the increased imports of bacon stagger the belief. The number of swine received in the month was only 1888 as against 9193, and in the ten months 14,890 to contrast with 80,574. Of bacon, however, we received in the ten months 1,627,866 cwt. at a cost of £3,350,746, as against 804,173 cwt. at a cost of £2,037,629. It will be noticed from these figures that bacon was cheaper this year than last. Salted beef we got in smaller quantities, the sum paid in the ten months for it being £275,809, to compare with £472,903. For fresh or slightly salted beef in the ten months £72,526 was paid as against £34,916 in the corresponding term of 1871. We received more than three times the quantity of hams this year than we did last, but did not pay for them three times the amount of money, the sum being 343,096 to compare with £139,716. For meat described in the returns as "unenumerated" we paid £11,010, and for preserved meat £704,976, which was nearly £200,000 more than last. For pork, fresh and salt, we disbursed £388,894 which was about £100,000 less than last year. Poultry and game were imported in larger quantities. The total sum expended up to the end of the month of this year, upon the various kinds of agricultural commodities enumerated, was £9,333,759, a sum surely too large for a country with the capabilities of meat production as we have. It has with proper security for capital expended on the land.

For poultry produce we this year, so far as it

ie, have paid £5,144,386 for butter, and 2,504, which is fortunately, together, a million sterling less than what we led last year. With reference to eggs, cry is, still they come," in greatly ind quantities, the number of great hun- received this year being 4,161,519, as t 2,922,889, and the cost £1,621,021, npare with £1,083,391. These con- r recurring and progressively increasing , should arouse the attention of those ave the means of keeping poultry, to : themselves more earnestly than they et done to this branch of agricultural ndry.

imports of wheat during the month those of the corresponding term of ar by nearly 700,000 qr., and in the period the increase is much about the Barley and oats were also in excess year's importations, and the sums ex- l larger, as the following tables shew:—

| QUANTITIES. | | | |
|-----------------------------------|---------------------------------------|---------------------------------------|--|
| | Ten Months ended Oct. 31, 1871. | Ten Months ended Oct. 31, 1872. | |
| Wheat. | Cwt. | Cwt. | |
| 1..... | 13,310,475 | 14,688,056 | |
| ark | 85,113 | 350,055 | |
| ny | 2,447,256 | 3,402,556 | |
| e | 122,004 | 1,891,905 | |
| an Territories ... | 239,147 | 42,232 | |
| y, Wallachia, } Moldavia | 1,389,766 | 745,424 | |
| ..... | 544,866 | 1,980,440 | |
| l States | 10,832,561 | 6,386,928 | |
| ..... | 411,085 | 1,247,441 | |
| l North America | 2,426,248 | 997,117 | |
| Countries | 556,817 | 1,384,398 | |
| Total..... | 32,365,338 | 33,116,552 | |
| VALUE. | | | |
| ..... | £7,575,666 | £8,664,235 | |
| ark | 53,217 | 237,240 | |
| ny | 1,607,711 | 2,303,333 | |
| e | 62,978 | 1,220,019 | |
| an Territories ... | 158,475 | 25,229 | |
| y, Wallachia, } Moldavia | 725,410 | 400,138 | |
| ..... | 297,297 | 989,666 | |
| l States | 6,492,870 | 4,122,296 | |
| ..... | 271,132 | 824,831 | |
| l North America | 1,427,530 | 657,306 | |
| Countries | 346,240 | 835,249 | |
| Total | £19,018,526 | £20,369,542 | |

| QUANTITIES. | | | |
|------------------------------|---------------------------------------|---------------------------------------|--|
| | Ten Months ended Oct. 31, 1871. | Ten Months ended Oct. 31, 1872. | |
| | Cwt. | Cwt. | |
| Barley..... | 6,445,039 | 10,921,911 | |
| Oats | 9,179,741 | 10,026,597 | |
| Peas | 715,086 | 994,485 | |
| Beans | 2,391,497 | 2,534,376 | |
| Indian Corn or Maize..... | 14,260,760 | 20,553,505 | |
| VALUE. | | | |
| Barley..... | £2,526,455 | £4,358,738 | |
| Oats | 3,471,507 | 3,628,760 | |
| Peas | 313,112 | 430,472 | |
| Beans | 1,029,110 | 1,020,068 | |
| Indian Corn or Maize..... | 5,467,574 | 7,320,151 | |

| QUANTITIES. | | | |
|------------------------|---------------------------------------|---------------------------------------|--|
| | Ten Months ended Oct. 31, 1871. | Ten Months ended Oct. 31, 1872. | |
| Wheat Meal, and Flour. | Cwt. | Cwt. | |
| Germany | 771,327 | 841,286 | |
| France | 14,409 | 750,045 | |
| United States | 1,603,807 | 459,941 | |
| British North America | 295,445 | 239,201 | |
| Other Countries | 662,023 | 763,852 | |
| Total | 3,347,011 | 3,054,325 | |
| VALUE. | | | |
| Germany | £724,737 | £784,258 | |
| France | 13,032 | 674,645 | |
| United States | 1,298,236 | 375,715 | |
| British North America | 226,374 | 208,257 | |
| Other Countries | 651,896 | 782,383 | |
| Total | £2,914,275 | £2,825,258 | |

Turning to manurial substances, we find a considerable increase in the receipt of bones in the ten months, and for this valuable substance we paid £547,190. Guano, although a large increase is noted on the month, shews a decrease in the longer period, the amount we invested in it this year being £1,012,319, as against £1,842,896 in the corresponding term of 1871. Nitrate of soda was in greater demand in the ten months, the sum we expended upon it being £1,042,967, to contrast with £886,289.

With reference to feeding stuffs, we observe that there was a falling off in oil-cake to the extent of nearly £200,000, only £1,072,216 being given for it, in comparison with £1,268,763 last year up to date. Cotton-

cake shewed a decrease on the month, but an increase in the ten months. On flax and linseed there is noticeable a very decided increase. Hops were sent in greatly diminished quantities; so also clover and grass seeds.

There is an enormous increase in the supply of potatoes consequent upon the failure in our own country—3,085,852 cwt. have been received at a cost of £923,766, while in the corresponding ten months of last year our supplies only amounted to 515,695 cwt., obtained at an expense of £152,275.

Wool fell off amazingly during the month, not half the quantities we received in the October of 1871 reaching us. The Australian Colonies were in this instance the principal defaulters.

| QUANTITIES. | | |
|--------------------------|------------------------------------|------------------------------------|
| | Ten Months ended Oct. 31, 1871. | Ten Months ended Oct. 31, 1872. |
| Wool, Sheep, and Lambs. | lb. | lb. |
| From Countries in Europe | 47,804,521 | 33,234,910 |
| „ British Possessions | | |
| in South Africa ... | 28,666,926 | 28,180,955 |
| „ British India | 17,640,859 | 16,892,194 |
| „ Australia..... | 178,933,110 | 166,213,543 |
| „ Other Countries..... | 27,585,205 | 30,513,463 |
| Total..... | 300,630,621 | 275,035,065 |

| VALUE. | | |
|--------------------------|-------------|-------------|
| From Countries in Europe | £2,618,617 | £1,892,998 |
| „ British Possessions | | |
| in South Africa ... | 1,516,354 | 1,849,718 |
| „ British India | 621,927 | 750,661 |
| „ Australia | 10,597,648 | 10,362,254 |
| „ Other Countries..... | 1,029,223 | 1,472,486 |
| Total..... | £16,383,769 | £16,328,117 |

Our export list of home-grown produce is a meagre one, consisting of £249,026 for butter; £65,468 for cheese; £151,711 for horses; in all cases the sums are lower than those obtained last year.

The following tables shew the quantity and value of wool exported, and the countries to which the commodity was sent:—

| QUANTITIES. | | |
|-------------------------|------------------------------------|------------------------------------|
| | Ten Months ended Oct. 31, 1871. | Ten Months ended Oct. 31, 1872. |
| Wool, Sheep, and Lambs. | lb. | lb. |
| To Germany | 1,974,993 | 1,551,543 |
| „ Belgium | 2,289,895 | 1,037,251 |
| „ France | 2,398,568 | 899,592 |
| „ United States | 1,982,238 | 1,773,251 |
| „ Other Countries ... | 1,407,103 | 960,887 |
| Total | 10,052,797 | 6,222,524 |
| VALUE. | | |
| To Germany | £135,725 | £128,727 |
| „ Belgium | 146,647 | 93,677 |
| „ France | 184,646 | 82,389 |
| „ United States | 110,839 | 124,212 |
| „ Other Countries ... | 107,611 | 89,730 |
| Total | £685,468 | £518,735 |

THE SUBSOIL AS MANURE.

AT the May meeting of the Farmers' Club, it will be remembered, Mr Machi read a paper on "Cultivation, Manuring, and Cropping," in which, among other things, he expressed his strong conviction in the efficacy of subsoiling. "Science," he said, "teaches us that in the subsoil we find increased profits, for it teaches us that the great majority of soils, the whole of every depth contains a certain portion of the elements of plant food which only

require aeration and amelioration, by disturbance, drainage, and manure, or by burning, to render them gradually available as plant food. Farmers, as a rule, have no faith in the subsoil, but, on the contrary, rather fear it, believing that there is something unwholesome under the cultivated crust, and that the interior of the pie is of the wrong sort. The fact is, that it is raw and uncooked, because it has never, like the top soil, been stirred, and exposed to the

ameliorating and fertilizing influence of the atmosphere, and in too many instances, for the want of drainage, air is completely excluded by the presence of stagnant water." Mr Mechi will no doubt, in spite of the doubts expressed by the members of the club on that occasion, be glad to hear that in America his ideas have been taken up. In the *Country Gentleman* of October, "F. G." writes:—A correspondent of yours says, "I know by experiment and experience that there are subsoils (worthless, judging by the eye), that, used as top-dressing for grass lands, will give as large an increase of hay as a heavy dressing of farm-yard manure, phosphates of guano, or any other manure I have ever used." Now this same soil, brought up in ploughing and exposed to the elements, must, from necessity have the same effect, for the mere fact of applying it cannot alter the case; the soil is there, acted upon in the same manner. This at least is true, that such soil, or some soil, brought up to the surface, is an advantage to the crop, and forms an excellent seed bed for clover and timothy, with heavy yields following. It is my experience. Some of the land on the homestead which I worked for many years, is of this nature. One lot in particular had a striking effect. The land was ploughed up to the beam, some 5 or 6 inches deeper than usual, bringing up a deep bed of raw soil, of a powdery and various coloured nature. It was a hillside facing the south, and composed of sand, gravel, and clay, the clay in a pulverized state. The land was not very good and had been considerably run, having never received any manure, grass and clover being depended upon for enrichment.

The first year the crop was almost an entire failure; there was doubtless too much of the raw material. The grain started, but did not thrive. The next year was somewhat better, but not much; the same depth of ploughing continued. Clover and timothy were sown (with the grain), and a fair catch resulted. The clover did well, and the timothy following (after the clover was run out), was an improvement on former crops. But the land became better, the grass thicker

and heavier. Grain followed—same depth of ploughing—also improved; all this time no manure used. There was a great depth of mellow soil; and this was thoroughly heated, being directly exposed to the sun. After this the land was stocked down to clover and timothy, and what seems a permanent sod is the result. Seldom is there such a growth, close, dark and rank, a thick mat of roots and grass; and such is the case now after many years of trial. A few years since some manure was applied, and benefited it somewhat.

Now had this land been ploughed to the same depth as usual, working only the old soil over, there would have been a loss almost yearly, as is the case with too much land. Land treated in this way must have manure. But the undersoil brought up answered the purpose—that surely did it in the case I have related. Doubtless the strength of the land had somewhat worked down, and with the original fertility of the sub-soil, formed a rich bed for cropping. But it took years to bring it to the true state of efficiency. It acted as manure; and is much more lasting. The mechanical condition of the land had also something to do in the case, being worked so as to be deeply mellow, acting thus as drainage, and for gathering a retaining moisture. With more sand, or sand and gravel, the thing doubtless would have been different. But there was considerable clay, and this in a fine, almost powdery state, still more reduced by the action of the air. The same soil carted on a meadow would have benefited it beyond any doubt.

That a large share of our land needs working up from below, is as clear to the writer as any fact in agriculture. It is probably best to do this gradually, bringing up an inch or two of soil at a time; but do it at all events, if it has to be deepened at one ploughing. A fallow is a good means to treat soil in this way. The difficulty is, we are discouraged when we bring up considerable raw soil at a time, and it proves for a year or two to be no benefit, or even perhaps a hurt. It *will* in the end, and that soon, pay, and

FLAX CULTURE IN IRELAND AND ITS LESSONS.

THE acreage under flax crops in Ireland this year ('72), is smaller than in any year since 1851, except 55 to 58 inclusive. That which operated to produce these exceptions, having passed away, we must look to other causes for the present state of matters; and we have not far to go for an explanation. "The Exhibition" placed the spinning of fibres, and the manufacture of fabrics, for which the United Kingdom has been so famous, on a common platform, and opened the prizes for doing so well to all the world. But against all likelihood Ireland's textile manufactures became somehow more intensely local, and to this must be traced one of the chief reasons why flax culture and the linen trade have never had their proper place in the United Kingdom. If the principle on which the Exhibition was based had been duly applied, it would for all agricultural purposes have rendered the distinction between England, Scotland, Ireland, and Wales *nil*; except so far as certain specialties of white flax crops indicate to each the particular line in which alone it can excel. In fixing upon a place for a special crop, all things affecting its probable success must be fairly considered. In Connaught and Munster, for example, the climate and soil of which are in favour of flax crops, crude, indolent, and wasteful farming, far more than counterbalance the disadvantages of less favourable soil and climate, where science, industry, and economy are observed. The conditions, therefore, in which flax culture is open to agriculturists are

1. The soil is generally less fitted for flax crops than that of any other part of Ulster; and the climate is the whole the worst of any in Ireland.

2. The soil is generally less fitted for flax crops than that of any other part of Ulster; and the climate is the whole the worst of any in Ireland.

On the face of these statistics, one uninitiated in Irish affairs might most erroneously jump at the idea that flax is a condemned crop in that country. Besides, if special pleading were resorted to, there is on the surface of these figures several things which might be distorted into shapes apparently favourable to false conclusions that flax does not suit Ireland. The fact is, the people rarely give it a fair trial outside Ulster, and even then so much is expected from flax, that for the British to be misled by the Irish in this matter, is to fly in the face of sound sense. But the apparent mystery of the Irish farmers' conduct in regard to flax crops, will be the less misleading when we remember that for years the people have been influenced by the well meant empiricism of the late amiable Earl Carlisle. The hobby of this well-intentioned, but truly unreasoning leader of thought in Ireland, was that she was only fitted to be "the fruitful mother of flocks and herds." Sir R. Peel, Bart., while in office, and whose policy was sound, except where it was marred by this long-exploded error, acting on the fallacy by which it held its flimsy hold of the popular mind, sought out and obtained a subsidy in favour of flax-growing. This blunder was based on the supposition that because flax was necessary to the linen trade of Ulster, and as that trade was the only one in a healthy condition in the country, it was requisite to subsidize the growers of a crop which was on its merits less likely to be adopted than green crops or cereals. How did the case then, and how does it stand? Take the County of Down as an illustration. In that county the soil is generally less fitted for flax crops than that of any other part of Ulster; and the climate is the whole the worst of any in Ireland. It is also either good seed, or fine fibre. Yet the average acreage under flax had for the past twenty years been at a rate which,

out in the more favourable portions even the same scale, would give and 500,000 acres per annum. In the other counties in Ulster followed this and grew flax largely, and until they had come to like it. But while Sir R. Grosvenor was being given — £2000 a year, £3000 others, and £4000 in the most famous flax culture became less. The fact was never considered, that a flax crop pays at least 50 per cent. more than any other crop, the County farmers cry out against it. Its usual profit in excess of grain is from 80 to 100 per cent. Besides, the people of the other counties grow flax mostly because they are not so well covered, and the granting of the subsidy much to mislead them, as does also the "free and easy" policy of the Flax Extension Association, whose labours are yearly almost valueless. The remedy for this violence and which stultify the Irish amongst agriculturists is to make flax-growing an imitation. For all practical purposes it is a stolen crop, in Ulster. No other crop not a beast less was raised in that county than was produced in Leinster, Connaught and Munster, according to acreage, climate, while little or no flax was

grown. Therefore Ulster had all the advantages of other crops, and the millions per annum besides raised by flax-growing. It is no wonder, then, that her people are better fed, more suitably, and often more fashionably, clothed, than the people of other parts of Ireland, the upper classes, which are alike everywhere, of course excepted. When one looks at flax statistics in the light of other facts, social and agricultural, no longer does any astonishment exist as to the readiness with which landlords collect their rents in Ulster, as compared with other parts of Ireland.

But taking the whole case summarily, ignorance of facts which led even a wise statesman to grant a most misleading subsidy, indolence which holds the Connaught, Leinster, and Munster farmer in the "free and easy" rut of past ages, and avarice which blinds the eyes of the prospering Ulster flax-grower, have reigned already so long, that we trust their baneful effects will no longer be allowed to operate. On the contrary, we trust that as flax is wanted for our textile trade, and as it may be largely raised at home most profitably, and especially as in good farming it is almost a stolen crop, British agriculturists will open their eyes to facts, and give flax culture a fair consideration.

HARVESTING AND CLEANING SEED.

By PROFESSOR BUCKMAN.

WHEN devoting this paper to an examination of the more practical points of the preparation of seed for the purposes to which it is purposed to give an idea of the varied results of the analyses of almost every class of crop. It is understood at the outset that these will have reference to the preparation of seeds for the seed market, and of grain as food, two matters to be considered before the Maidstone Farmers' Club.

be kept distinct, because the growths for the one purpose will offer very different considerations from those of the other. Crop seeds may, for our present purpose be very conveniently divided as follows:—

1. Cereal grasses, corn or grain seeds, wheat, barley, rye, oats, &c.
2. Fodder grasses, as rye grasses, timothy grass, &c.
3. Clovers, sometimes termed "artificial grass," &c.

is table we see how it is that farmers careful cultivators of weeds, as, on position that all the weeds in a sample germinate, these of themselves would be sufficient to occupy the soil, and the old adage "ill weeds grow apace" is often exemplified, the weeds getting on better than the intended crop. And "seeds" they themselves are left to be, the following table, calculating reproductive powers of some of our weeds, will well enough illustrate the proverb, alas! equally true, namely

"One year's seeding
Seven years' weeding."

| amples. | In a single plant. | Remarks. |
|------------|--------------------|---|
| ard | 8000 | Common about farms. |
| ..... | 4000 | |
| purse .. | 4500 | An agrarian weed. |
| ley | 6000 | |
| on | 2040 | Everywhere too frequent. |
| amomili.. | 40650 | About manure heaps, from whence it gets to turnip fields. |
| ..... | 45000 | |
| ..... | 19000 | An agrarian, mostly with garden culture. |
| ..... | 6500 | |
| ..... | 2940 | In vetches, corn, &c. |
| lock | 13000 | In fields, meadows, and by road sides. |
| ..... | 50000 | |
| ..... | 50000 | On sandy soils. |

CLOVERS.

acts just insisted upon apply with still force to seeds of our agricultural weeds, as these are so much smaller. The I now append, is the result of an examination of several packets of seeds from different seedsmen :—

| amples. | Number of weeds in a pint. | Remarks. |
|-----------|----------------------------|---|
| er..... | 7600 | Grasses, Umbelliferæ and Polygonacea. |
| clover. { | 6400 | |
| ..... | 12000 | Plantain and Umbelliferæ. |
| ..... | 1040 | |
| er..... | 7840 | Umbelliferæ, Polygonacea, Creeping Crow-foot, &c. |
| ..... | 8400 | |
| ..... | 39440 | Plantain and small weeds. |
| ..... | 26560 | |
| ch clo- { | 70400 | Sandworts, Ranunculus, Polygonacea. |
| ..... | 70400 | |
| ..... | 70400 | Plantain, Polygonacea, and Caryophyllaceæ. |

WEED SEEDS: THE ECONOMY OF PURCHASING PURE SEEDS.

From this table we see the enormous fecundity of our common weeds, so that allowing weeds to seed in any crop furnishes work to get rid of them for many succeeding years. It remains now to account for the circumstance of such bad samples of seeds as those mentioned in Table II. ever getting into the market at all, and if we at present confine our attention to grasses, it will be found as a law that dirty patches usually yield a better profit by being seeded, than clean ones; and also that seeding them is more profitable than using them for fodder purposes. Weed seeds weigh as much, if not more, than grass seeds, and of the weed grasses the most common one, the *Bromus mollis* (soft brome or lop) is much larger and heavier than the seed of the ryegrass, with which it is so constant. In as far as yield of fodder is concerned, when weeds are present, the nutritive matter of the crop is diminished, and the bulk of the whole lessened, but it is almost a law that when the leafage is kept under the seeding powers become greater, and hence dirty patches of "seeds" pay better for seeding than for any other purpose, and such samples find a ready market on account of their supposed cheapness; for the growth of good and perfect samples entails additional expense, which must be paid for. If farmers sufficiently consulted their own interest they would most carefully avoid the cheap and dirty seeds of all kinds, for though cheaper now they have ultimately to make up for it, not only in the deficiency of crop, but the everlasting after-expenses to get rid of those weeds they themselves have planted. The difficulty of getting grass seeds perfectly fine must be admitted by all; still, if farmers make up their minds to get them so, and will pay a little additional first cost, the matter is simple enough, and even if they are not able to analyze seeds with the requisite amount of care, I should contend that the subject of pure seeds is as important as that of pure guano, and consequently that each agricultural society should have an officer attached whose duty should be that of analyzing seeds.

ughter Maiden bred the renowned Mantalini. was Raine's Lord Lieutenant 4260 which was 4210, a famous bull, whose son Fitz 7010 was the sire of Crown Prince 10087, the most successful getters bred at Warlaby. worthy of note that the dam of Crown Prince Cuckingham 3239. Lord Stanley 4269, too the Earl of Carlisle, and, although of the family, crossed with other blood), was used by, and to him must be accredited the great Yorkshire winners, Birthday, Ladythorn, and Alba.

Cross of Exquisite 8048 was not as successful as because (as Mr William Sanday stated at "Lord Spencer's stock, though neat in form, *sting in flesh and robustness*;" and further, it was infused too raw into the Booth herds' History, page 51).

Other valuable shorthorn families, as well as the Booth sort, have had fresh blood introduced from time to time. Mr Bates crossed his with Belvedere 1706, also with Cleveland 7 and Cleveland Lad 2d 3408. It was the

Belvedere repeated that produced Duke of Cumberland 1940, one of the best bulls ever seen. the Duchesses, too, have the cross of Norfolk the cross of Usurer 9763 in their pedigrees. Grand Duchesses derive some of their blood from both sources through Prince Imperial 15095 and Duke 3d 16182; some also from the tribe: while the Oxfords have, almost all, the of either Priam 18567, Earl of Warwick 11412, of Eryholme 12205, Romeo 13619, Marquis bas 11789, Seventh Duke of Airdrie 23718, routine 11662; and in many of the Oxford pedigree such crosses occur.

Present fashion does not, however, accord with sense and practice of the great breeders of former times because it imperatively demands that animals be pure Booth or pure Bates in order to fetch good prices.

Breeders of this day are, therefore, unable (unaided of considerable courage) to avail themselves of any great extent of their own judgment in selecting sires to improve their stocks.

The principle of selection, though its necessity is never admitted and insisted upon by Darwin or celebrated naturalists, is now, practically ignored, because the number of animals—pure or pure Bates—from which breeders of the restraints can select, consistently with obeying nature, is necessarily limited. That number is further circumscribed by reason of many such being of inferior shape and delicate constitution also by the large amount of infecundity which is generated in many famous strains of cattle by continued inbreeding and forcing for ex-

William Sanday, formerly of Holmepierrepont,

whose experience and skill as a breeder are notorious, spoke upon this subject last autumn at Newark as follows:—"My own opinion is that the animals bred in the present day are inferior both in size and in quality to those bred twenty or thirty years ago. Now if this be the case, surely there must be something wrong in the present system of breeding. It is evident that but little common sense can have been brought to bear upon the subject. I am convinced that the cause of this deterioration is the principle on which most herds are raised, namely, the fashion—or rather infatuation—of collecting from certain families without any regard to the qualifications necessary for producing and perpetuating good animals. To follow out this plan, in-breeding must to a great extent be resorted to, and the number of families on which such an experiment can be tried with the smallest chance of success is so limited, that, in the majority of cases, the consequences cannot fail to be ruinous. We all know the difficulty of raising and keeping up a good herd or flock. This can only be done by breeding from the very best males and females, but the present system seems to set this rule completely at defiance; if the animal be only of the fashionable strain it is sure to make a fabulous price whatever its quality."

Now, while we do not pretend to say that there are any better sires than a first-class pure Booth or Bates, still we are of opinion that there is much truth in what Mr Downing states, because there can be no manner of doubt but first-class animals of either of the families alluded to are becoming scarcer, and several of the best judges of shorthorns are beginning to think that the shorthorns of this day could not compare with those of a quarter of a century hence, fully bearing out the remarks of the great breeder, who said, "There are several men fit to be Prime Ministers but very few indeed fit to be shorthorn breeders." "Mixers" no doubt have often been "spoilors," but in the hands of such parties a closely bred herd would be just as likely to spoil. The mixtures which produced the Towneley Butterflies, Soubador, or Bolivar, could not indeed be well despised, neither could the Grand Dukes or Grand Duchesses of the late Mr Bolden. The truth is, although in-breeding was closely practised by the early breeders, still such physiologists were they that as soon as they found the least symptom of deterioration in their stocks, they unhesitatingly procured the sires from other stocks calculated to restore the balance

of symmetry. There can be no doubt but that the practice of modern breeders differs very much from that of the great founders of the breed. The modern breed from pedigree, the antients, if we may so call them,

from independent selection. There is therefore much room for thought in those few remarks of Mr Downing's, which it would be well for shorthorn breeders to consider and inwardly digest.

LORD SALTOUN ON STEAM CULTIVATION.

THE operations of the Philorth Steam Cultivation Company were inaugurated lately on the farm of Kirkton, of Philorth, Buchan, occupied by Mr Jas. Burnett. The trial of the implements (Messrs Fowler's) took place under unfavourable conditions. By recent heavy rains, the soil had been thoroughly saturated with moisture; and to make matters still worse, a great quantity of rain fell on the morning of the trial, which was sufficient of itself to engender fears lest the operations should be a failure. Unfortunately, too, a number of socks for the ploughs, and other little necessary articles, which had left Leeds on the Monday night previous, had not come to hand, and some slight inconveniences were caused thereby. The work of the plough and grubber was considered highly satisfactory, however. After the trials, a dinner was held, when Lord Saltoun, in proposing success to the new Company, made the following remarks:—

One of the most powerful instruments in the career of progress has been the introduction of steam into agricultural matters; and I can only say that I am exceedingly proud that the tenantry should have been the first to engage in the use of steam, and to combine with the great proprietors of the country in the use of steam. I am sure that the success of the trial will be a great encouragement to the tenantry to engage in the use of steam, and to combine with the great proprietors of the country in the use of steam. I am sure that the success of the trial will be a great encouragement to the tenantry to engage in the use of steam, and to combine with the great proprietors of the country in the use of steam.

caution, and therefore not to work the engines to their full power, but to go slowly with the plough, so that the full power, the full strength and rapidity of the engine, could not be exemplified. Yet in the few *contretemps* that occurred, from coming in contact with the boulders—and with very heavy boulders as they were—it has to be remarked that no part of the engines gave way. A few of the ploughshares might have been broken, and so on, but these were very trivial things, easy to be repaired. That shews the increase of the science of mechanics within the last few years, because, as I have been informed by some of our friends who have come from Kincardineshire to visit us on this occasion, on the first trial of steam ploughing in Kincardineshire, it was not the shares alone, or any trivial part that gave way, but the engine itself broke down, which might be considered to have a most depressing effect on the idea of the future success of the engine. In our case, we have nothing to complain of but these few trivial accidents, and I am rather glad that these few trivial accidents did occur. I am rather glad that we were engaged to-day in trying the engine upon ground like that field of our friend Mr Burnett's, which contained those large boulder stones, because it enabled the guides of the engine and those who worked the engine to shew with what ease these trifling difficulties were surmounted, and of what little importance they were, compared with the strength and power, and good working of the engines themselves. Gentlemen, it is not for me—in fact it is not within my power or my capacity, to expatiate on all the

t advantages of steam cultivation ; in time. We worked over 1035 acres, 2 re is no doubt that, beneath the pre- roods, 5 poles, and earned £442, 10s. 2d. face of the land, lies a rich mine of This season a much larger part of our to be got by deeper disturbance of country would have been fallow but for l, by turning up other soil, and by the steam power, and in the Howe, where deep tation of crops in consequence of stirring, especially in autumn, prevails, finger- and the only caution that is necessary and-toe has not as yet shewn itself ; while in people must not suppose that that is deep friable loam about Fettercairn, where he work of a moment. It must be they used to carry the sweepstakes, a few gradually. The best soil is at the top, loads will be all off large fields.' Of course, bt ; the worst, which will become his Lordship continued, experience will is below. But if you go for very deep shew whether that absence of finger-and-toe ion at once, and turn up the old soil, constantly attends deep cultivation, and the u put all the bad on the top. It must proper mixing of the land by deep cultiva- e gradually, and mingled, and therefore, tion ; but at all events it is a curious fact that r caution that is to be given to those in- in Kincardineshire, where there has been l in steam agriculture is to go gradually steam cultivation, finger-and-toe has not e present depth 2 or 3 inches deeper each shewn itself ; and where there has not been ntil they get a much better depth of that cultivation, in the very best land that soil, such as some of those corn lands used to carry off the prizes, finger-and-toe has e on each side of the lower banks of shewn itself to that extent, that a very few nube, where they have tilled the same loads of turnips will be all that will be got o 100 years without manure. Although off large fields. And there is a good reason r never expect to do that in this for it, and I can perfectly understand why it r, yet we may, perhaps, produce some- should be so, because the steam cultivator f the same sort of soil to a consider- and other implements in use mix the soil so pth. There are other advantages, and thoroughly that it is all equal, and every part the most curious advantages, and a of the root gets its fair share of good com- ll worth recording, has been stated in ponent parts and nutritive qualities of the r from a gentleman now present in the soil ; whereas, under the old system, the ay, to Sir Alexander Anderson, and soil being imperfectly mixed, some parts of at gentleman's permission I will read the plants were better nourished than others, ract from that letter. It is from a and that may have been the great cause of nan in Kincardineshire, who says :— of the finger-and-toe which it has puzzled so w set started in March, and got just many agriculturists to explain.

RECLAIMING MOUNTAIN LAND.

AT the Show of the South Tyne Agricultural Society last week, two prizes, in the shape of two handsome solid silver cups, presented by the Rev. Dixon Brown, of Unthank Hall, and J. G. F. Hope Wallace, Esq., Featherstone Castle, were given for the greatest improvement, by a proprietor or tenant, in unreclaimed mountain land or hill pasture, made within the ten preceding years, and in extent not less than six acres in one piece or plot. The entries included—Messrs Simon Elliott, the Knarr; George Stobbs, Ashholme; Thomas Bywell, Burnstones; R. Tweddell, Burnstones; Wm. Holmes, Town Green, Knarsdale; Jas. Green, Knarsdale; Thos. Little, Far House, Knarsdale; — Baxter, Greenhaugh, Knarsdale; and Wm. Parker, Knowhead, Knarsdale. The following is the report and award of the judges, Mr J. Usher, Simonburn, and Mr Clark, Featherstone:—

"After examining the whole of the reclaimed land entered for competition, and carefully considering the schedules handed in by the competitors, the judges awarded the first prize to Mr Thos. Little, Watch Cross, Carlisle, and the second to Mr Simon Elliott, Knarr Farm, Knarsdale. The land reclaimed by Mr Little is an allotment, 20 acres in extent, belonging to the Far House Farm, Knarsdale, and is at an elevation of about 1000 feet, with an exposure sloping to the north-west. The soil is heavy hazel, with a subsoil of a good quality, resting on a hard bed of sandstone. The land is in a very good state of cultivation, and is well fenced in by a high stone wall; secondly, the land is well drained, and is in a very good state of cultivation; thirdly, the land is well fenced in by a high stone wall; and fourthly, the land is well fenced in by a high stone wall."

bushels of lime to the acre, and in the spring of this year a portion of it was well salted, to requicken the lime. The mode of reclamation might thus shortly be stated as draining and liming, and from these operations a close set sward of natural grasses has been produced. The whole cost, without fencing, has been £9, 5s. per acre, which has been laid out in the following manner:—Draining, £5, 5s.; liming, £4. After draining the lime was spread on the surface, without burning the heather where the land was hard and heathery. The lime was laid in heaps on the land and allowed to slack before being applied, it then being more effectual in destroying the heather and tendering the soil for the production of grasses, but where soft and grassy it was spread at once. Mr Simon Elliott's allotment is about 12 acres in extent, and lies at an elevation of about 950 feet, with a sloping southern exposure. It is black topped soil, with a clay subsoil on freestone rock. Before reclamation its natural products were heather, bent, and rushes, and it was very wet. The rent paid for it was 5s. per acre. The operations were commenced in 1866, and were similar to Mr Little's, but were carried out at rather less expense, the drains being only 3 feet deep, which scarcely seemed so effective as the 4 feet drains. Owing to the reclamation being jointly carried out by the landlord and tenant, the expenditure could not be given accurately, but was somewhere about £8 per acre. This plot is in pasture and has a fair sward, which is rapidly improving. The judges highly commended Mr T. Bywell's, Burnstones, whose allotment has been drained, for the portion reclaimed by soiling and liming, and there have been 6 acres completed in this manner in one place or plot, they would certainly have awarded him a prize. The soil and climate in this district seem so peculiarly favourable to the production of pasture, that the judges found white clover and succulent

grasses springing up spontaneously as the land had been drained and

They are, therefore, of the opinion that a great portion of the mountain land in the district might be successfully and permanently reclaimed by judicious draining and

liming, with every prospect of a fair return for the outlay. The judges saw no land that had been reclaimed by ploughing, liming, cropping, and sowing down, forming good pasture; the artificial grasses were rapidly displaced by daisies and mosses.

A NEW SEWAGE EXPERIMENT.

OTHER scheme for the purification of our sewage has been added to already brought under the notice of tourists. The new experiment is known as Dougall Campbell's patent." A short time ago a practical experiment was made at Government works at Tottenham, in the presence of several gentlemen interested in the inquiry, including Mr Alfred Sibson, who, as analytical chemist, attended to investigate the process and the results thereof; and his report has just been published. The arrangements of receiving and settling tanks, &c., were the same as are in ordinary use at these works, the continuous settling being adopted; and although the settling tank is well constructed, so as to prevent the effluent water passing off with the sediment, the disturbance to the sediment as a whole, the size of the tank is hardly sufficient to secure a *maximum* clarifying effect by any process that might be employed. Tanks of large dimensions are being considered which will render the appliances complete in this respect. Of course, the capacity of the subsiding tank was unfavourable to the experiment. Then, other arrangements are of such a novel kind that the precipitating mixture has to be added to the sewage by a man dipping it out of a trough with a tin saucepan, and, there being no sheds available, the precipitated matter had to be dried in the open air, at a time when thunderstorms and showers occurred almost every day, so that not many days were lost before the yield of the experiment could be got tolerably

dry, but the continuous wetting must have washed out some of the ammonia which the mass contained.

The process essentially consists in adding to the sewage as it enters the works phosphate of lime in a soluble state, the materials employed being bone-ash and sulphuric acid; and after sufficient admixture, precipitation is accomplished by adding lime, which, being one of the best precipitants for sewage as regards purification of the water, is in ordinary use at Tottenham. "In a sanitary point of view," says Mr Sibson, "this process appears to be all that could be desired, the removal of all offensive water from the sewage water being complete and rapid. No objectionable smell was perceptible from the sewage undergoing the operation; while the effluent water was satisfactorily clear, and fit, in my opinion, to be discharged into any river without injury, although not so entirely free from suspended matter as it could undoubtedly be rendered by the use of larger tanks, such as are now being constructed, and the necessity for which has doubtless been apparent in all the processes that have been tried at these works." Now as to the product obtained. The "precipitated phosphate of lime," being in a condition in which it can be readily assimilated by plants, is but little inferior to "soluble phosphate" as a manure. In analysis it was estimated by a process devised by Mr Sibson, and commonly used by him for determining this constituent of phosphatic manures, in which it frequently occurs, constituting an item of considerable importance, although sometimes overlooked by analysts.

Then, adds the report, "as the phosphate of lime mixed with the sewage is derived from the parent source—namely, bone-ash—and as the material in the recently precipitated state is at least as effective a purifier of sewage as any of the precipitants which have been tried—the whole of the manurial constituents of sewage capable of precipitation are coagulated and carried down by it in the manure; while, at the same time, the phosphate of lime is itself a valuable fertilizing agent." Hence, the resulting manure is in a much more concentrated form than when bulky materials of little value are mixed with sewage for the purpose of precipitation. A sample gave the following analysis:—

| | |
|--|--------|
| Moisture..... | 19.04 |
| Organic matter* | 15.26 |
| Precipitated Phosphate of Lime..... | 23.14 |
| Insoluble Phosphates | 3.80 |
| Sulphate and Carbonate of Lime and Lime uncombined | 19.25 |
| Alkaline Salts and Magnesia | 3.14 |
| Insoluble matter | 16.37 |
| | 100.00 |

* Containing nitrogen 1.20; equal to ammonia 1.45.

Mr. Sibson remarks:—

"It will be seen to contain about 22 per cent. of phosphate of lime in the precipitated state, and about 1½ per cent. of ammonia, with other constituents of

less value. The proportion of ammonia is greater than I expected, and is probably due to a portion of the urine compounds being precipitated by the lime."

It will be observed that, from the imperfect drying, the mass contained about one-fifth of its weight of water; so that, with more efficient drying, the manure would contain a larger proportion of valuable ingredients than appears in this analysis; while, with more perfect settling in the tank, the quantity collected from a given volume of sewage would be greater. According to Mr Sibson's scale for the valuation of manures, precipitated phosphates should be reckoned at 3s. per unit, and ammonia at 20s. per unit, making the manure of the above sample worth £5 per ton. Drier, of course it should be worth more. In the experiment made upon more than 3,000,000 gallons of sewage, the total weight of solid manure obtained was 50 per cent. greater than that of the materials employed for precipitation. In concluding his report, Mr Sibson says:—

"The manure will be worth a fair market value, sufficient, I should imagine, to allow of the process being remuneratively carried on. Such a composition will allow of a *bona fide* competition with other manures in the market; and this I consider the chief point of superiority of the process as compared with some others in use for dealing with sewage."

SEWAGE—FILTRATION AND IRRIGATION.*

BY MR J. WIGGIN.

THE subject of town sewage in its economic application to agriculture, is of national importance, and is beginning so to be recognized. It is necessary to enter briefly into the subject of the relation of sewage to the health of town populations, and of the urgent necessity to do something in settlement of the question which is now forcing itself upon the attention of the authorities of all our large towns. In its present magnitude, it is of but recent rise. The

Read before the Lavenham Farmers' Club

difficulty has been chiefly caused by the boasted civilization of modern times. Formerly the drainage of our towns was a surface one, the open gutters in our streets carrying off the rain as it fell into the nearest river, the small quantity of organic matter being oxidized and rendered innocuous by the fullest exposure to the atmosphere. The faecal matter proper, together with the vegetable refuse and ashes, were received into covered middens or dust-bins, kept preserved from the rain, and periodically carried away by farmers' waggons

enriching the land with a valuable

This state of things, which had existed from time immemorial, and under which I have never been troubled with the sewage, has of late years been upset. I will tell you the name of the inventor of the earth-closet. I trust it will ever remain a novelty, as, to his genius the country is indebted for the cause of the sanitary muddle of the present day. Before his time, a gracious Providence having freely given us pure water, we had also taught us the natural necessity of any excess of it was in the nearest Man had also taken care to preserve the earth-closet matter and refuse in as small a bulk as possible, that it should be the least possible nuisance to him, and sufficiently valuable to the agriculturist to induce him to remove it. The introduction of the water-closet and all these arrangements, which had been well for centuries, by mixing these with the valuable when separate, into that filthy puddle which is now rapidly consuming our water supplies, and changing the purest rivers into offensive, dirty streams.

To an extent is this evil now acknowledged that whereas a few years since one of the Acts of Towns ordered that in all places where it was adopted a water-closet was affixed to every cottage, it is the law now to revert to the old dry covered way and no cottages are now allowed to be built in Rochdale, Manchester, Nottingham, and several other places without an Act, nor can they be kept dry, and so they can be cleansed at stated periods.

SEWAGE SCHEMES AND SEWAGE EXPERIMENTS.

The earth-closet system of the Rev. Mr. Rogers is one that has proved very successful, and is another step in the right direction. I have little doubt that in a few years we will find still more perfect appliances and find greater facilities afforded in new ways for the removal of the soil. Time will allow me to enter into minute details of the various schemes by which in the past it was endeavoured to remedy the various evils of things. At first, simple subsi-

dence and irrigating the low meadows of the neighbourhood with the watery part was tried, as at Leith, but as the nuisance from the smell was only diminished by enlarging its area, it was soon found other means must be used. Many eminent men, both chemists and engineers, have invented plans, none of which can be called successful. Their object hitherto has been to facilitate the rapidity of deposit of the insoluble matter. This has been done in nearly all instances by the addition of lime, alumina, charcoal, and various earthy matters. The results in no instance have continued to be equal to the sanguine views of the inventors, and it may safely be asserted the addition of the precipitant has reduced the manurial value to the lowest point, whilst the effluent water has in no case been pure. A process that has been elaborately experimented upon, and may be taken as a type of the majority, is the one called the A B C, said to be so named from the initial letters of its three principal constituents—alum, blood, and clay. It is now in process of trial at Leeds, Leamington, Hastings, Crossness, and other places. I have been furnished with samples of the effluent water and manures manufactured by this company at several of these places, which I have the pleasure of submitting to your notice. The money value put upon them by the company is much higher than that of Dr Voelcker, who has published an elaborate series of experiments on the value of the A B C manures to the farmers. He estimates its worth as being from 14s. to 18s. per ton. It is, therefore, practically useless to them except on the spot. A ton of this so-called native guano he estimates as barely equal to a ton of farm yard manure. Dr Voelcker has also published an elaborate report upon the value of the earth-closet manure. He arrives at conclusions different to the prospectus of the discoverer, and rather unfavourable to its agricultural value, considering that after three times drying, it only contains ammonia and phosphates equal to 6s. 2½d. per ton more than dry mould. I am much inclined to believe his estimate must have been taken

under unfavourable circumstances. I can easily conceive, unless the ammonia were fixed in the drying processes, the full quantity would not be estimated. Beside this there can be no doubt that both the phosphates and the nitrogenous matter would be in the best form for the plant assimilation. It must also be taken into account that a dry system can be adopted anywhere, and be in reach of every farmer, whereas any system of ordinary sewage treatment can only be done in large towns, the carriage from which is an important item to contend with, and may be sufficiently costly to bar its use.

THE BRITISH ASSOCIATION AND SEWAGE IRRIGATION.

The latest addition to our knowledge in this direction has been the report of the Committee of the British Association for the Advancement of Science, made at Brighton. Four years ago the Association made a grant of £10 to investigate the subject. The next year £50 were voted, which was supplemented by grants from various corporate bodies to the value of £1530. The committee begin by reporting their funds as exhausted, although the end of their labours was not reached. After touching upon the system of filtration through charcoal of the Messrs Weare, the effluent water of which is described as diluted sewage, they note Gen. Scott's plan of making a cement from sewage matter and its precipitants by burning them together, thus getting rid of the manurial element quickly, but to the nation at a costly waste. The effluent water here again is said to be diluted sewage. Whithead's process is more fully descanted on and reported favourably. It consists essentially of the precipitation of the sewage by excessive additions of mixed phosphate of lime and milk of lime. In this process, rapid, the suspended matter is precipitated, and much of the organic matter is precipitated. Of course the precipitate containing so much phosphate would be valuable, and if it contains, as asserted, 10 per cent. of ammonia, it is still more so. Here again the effluent water is not mentioned in the discussion which followed

one learned professor described the report as valueless, and disputed the calculations of the Committee. Another declared they had done nothing, and that no practical result had been given such as would be of any value to the country. It appears that the cost of the phosphates before employment is about £4 per ton, and the increase in value after having been made into manure is not more than 10s. In all their reports much stress has been laid upon sewage irrigation, and doubtless over the extremely limited area over which it is practicable its application will be attended with excellent results. Mr Hope, whose farm at Romford promises to become a rival to the famed one at Tiptree, states he has grown 80 tons of rye-grass per acre, and will soon obtain 100 tons, being able to keep four cows per acre: whereas in the best parts of Cheshire it required two acres at the least to keep one. Professor Corfield asserted that of the whole nitrogen escaping with the water 40 per cent. went off with the crop, 10 per cent. was lost in the drainage, and the remaining 50 per cent. was left in the soil, furnishing food to the plants after the sewage-water was discontinued. Should this statement prove correct, it sufficiently indicates the vast importance of sewage irrigation, whilst it shews the great national loss we yearly sustain by allowing even the effluent water of these systems to pollute our rivers.

DEALING WITH SEWAGE PROFITABLY.

From what I have said I think it will be evident to every farmer that no system of treating town sewage at present known will make it *per se* of economical value to him. The best that can be said in its favour is that it may be a good base to which to add ammonia and phosphates from cheaper sources. There can be no doubt that the really valuable constituents of town sewage are held in solution not suspension, and that these are lost to the community. It is much to be regretted that so enormous a waste should be going on at our doors. I trust before many years the combined talent of the chemist and engineer may discover some means of getting over the difficulty which modern fashion has

ed. When the chemist has discovered precipitant for the valuable fertilizing r, the engineer will doubtless soon ar- for its collection and treatment. We then be in a position to return to the the greater part of the nitrogenous r and phosphates received from it in ood, and now, alas, wasted. We shall no necessity then to scour the world to discover cheap phosphate deposits. Wiggins remarked that he would shew the men present the state of the effluent s from Hastings and Leeds, sent by the tary of the A. B. C. Company. After teresting series of tests, he remarked he water from these two places was, in r, but diluted sewage, and, in his opinion, tained the great majority of salts, valu- to agriculturists for fertilizing purposes. ough they would be wrong in invest- the various companies which were d, until some much more improved n had been discovered. Mr Wiggins eferred to the opinion expressed by Mr r Denton in his report to the Ipswich Board of Health as to the best means ering the town of Ipswich, which opinion d out that which he (Mr Wiggins) had ssed. Mr Bailey Denton in his report

said :—"That although such companies might relieve the borough for a time of certain difficulties and trouble in dealing with the sewage, there really is no ground for believing that the solid compost they make will be sold at a profit after the novelty of using it has passed away, failing which, the works would inevitably be thrown on the hands of your Board; that the manufacture of manure at the sewer's mouth may become a local nuisance; and the clarified water, after the solid matter is taken from it, contains more fertilizing material than the extracted solid matter, and as this liquid would pass into the river its value would be lost." This statement was supported by the following letter from Mr Bircham, of Chosely, near Lynn :—"Referring to your favour of the 10th of November, addressed to me on this subject, I beg to say that after a second trial of this (so-called) manure, under circumstances exceptionably favourable to its success, if it really possessed any fertilizing properties at all, my first impressions are fully confirmed. I find the stuff absolutely worthless, and the crops to which I have applied it now growing on my farm bear ample testimony to this, as any one who chooses is at perfect liberty to see."

ITALIAN AGRICULTURE.

7E are glad to learn from a Special Correspondent of the *Times*, that ultural progress is making way in Italy:— the information I have yet obtained, er during my journey down or when I to you from the Italian provinces during urly summer, points to improvement in ulture and increase of prosperity—slow, ps, but still decidedly perceptible. part of the old Roman States produces quantities of grain, chiefly wheat and *Turco—fromentone* it is here called, he names of things are continually ing as one travels through Italy—which

in Western Europe is known as maize. "We also grow an immense deal of wine," said a country gentleman of the neighbourhood, "but it is worth nothing." By this he did not mean to depreciate the quality, for it is an agreeable *vin ordinaire*, and some sorts, when bottled and kept for a while, are above the average, but to mark the low price which rendered it an unprofitable crop. It will bear transport by sea, but there is no demand for export, and it is sold for almost nothing. The fact is that there must be a revolution in the mode of Italian wine-pro- duction before it is likely to become known.

or asked for out of Italy. The object of the growers must be to produce certain types or classes of wine. This is done in all the countries that have now any important export of wine. Beginning with that first of vineyards, France, we find a very limited number of classes. There are the Bordeaux wines, of which the peculiar merits and excellence render it unlikely they will ever be paralleled; there are the wines of Champagne and of Burgundy and of the Côtes du Rhône—four classes in all. If other wines than these find their way out of France, it is that they are grown to imitate one of those sorts, or are made up to resemble them by the ingenious chemists and wine-compounders who have their principal dépôt at Cette. Here, in Italy, unity of action among wine-growers does not exist, although it is, perhaps, beginning to do so in one or two provinces. In this respect, as in others, there has of late years been improvement in Piedmontese wine-growing, and the Chianti wines in Tuscany are becoming known as a class. The principal of these is Baron Ricasoli's Broglio, which has considerable merit for an Italian wine, and which would probably greatly improve if kept in bottle, as do some of the Piedmontese wines, and notably the kind known as Barolo, which, when it gets old, has much the character of light port. But, in by far the larger portion of Italy, the wine is made anyhow, and every grower follows his own devices. The grape is badly grown, to begin with, generally far from the ground, trailing over trees, of which the foliage often keeps from the grapes the sunshine so indispensable to their flavour and perfect maturity. A better system, witnessed in some of the districts I have lately visited, is that of trailing the vine, in long festoons, from tree to tree. Thus grown, it gets more sun, and may be better managed. But the only proper way to grow vines is on plants, so grown as to produce the greatest possible amount of grapes in the least space. This is rarely observed. The grapes are nevertheless neverthe- less better made, but, when gathered, they are very much bruised, and the wine is afterwards indelicate in flavour and ill kept. In any

places they are put into enormous vats, containing hundreds of barrels, a practice spoken of by experienced growers as unfavourable to its preservation and condition. In the province of Ravenna, from the brink of which I write this letter, the wine can hardly be kept from vintage to vintage, and it frequently happens that last year's wine is sour before the following year's growth is ready for consumption. Under the present want of system and bad viticulture, wine, which ought to be a source of wealth to this country, since it is one of its principal products, is sold for next to nothing and almost thrown away. The prices (often 1½d. or 2d. a quart) at which it is obtainable in most wine-growing districts, may give some idea of the profits of those inn-keepers who charge 2s. or 3s. for a bottle of Italian *vin ordinaire*. What is wanted in this country is an importation of experienced French wine-growers. It would be difficult to overcome the prejudices of the natives and to get them to submit to the guidance of the foreigner; but the thing might be done, and the change, both in cultivation and fabrication, would soon be striking. The Sicilians have found means of producing a wine, which, although depreciated in England, because its name has often been given by dealers to inferior articles is, it may be safely asserted, when its best qualities are really obtained, superior to much of what is sold and drunk as sherry—the wine which genuine Marsala of Ingham's and some other first-rate brands, most nearly resembles. There seems no valid reason why Italy should not be as successful as Sicily, and produce red wines fit to vie with some of the stronger French sorts, and white wines as good as many that are exported from Germany and Hungary. But, to bring about so desirable improvement, the Italians must shew themselves self-helpful, and not look for Government initiative, as people are prone to do who have long been badly and despotically governed. The intelligent and truly patriotic portion—and I fully believe that this is no small one—of the class of country gentlemen, and particularly those, and they are many, who pass the greater

the year on or near their must bestir themselves, form ons, strive to enlighten and in- their farmers, obtain, if possible, stance of experienced foreigners, and their utmost efforts to derive profit territory which only asks fair and in- treatment to yield produce as ex- as its fertility is unbounded. In the of Bologna, Count Pasolini, of a, the former Prefect of Turin, is re experiment of growing vines upon ch plan, and the same is being done neighbourhood by a French gentle- The vines have been barely four years ground, and this year, for the first air fruit will be made into wine. It very surprising if it does not prove to that made from vines cultivated old plan. hing machines appear to be gene-

rally used in this district, but this is the only modern improvement of the kind that I can ascertain to have been introduced. Steam ploughs are said not to suit the nature of the ground, and its inequalities have been stated as the reason for this, but the country here- about is level enough, and perhaps a better reason may be found in the smallness of the fields and the practice of intersecting them with rows of trees, common in many parts of Italy, and here very prevalent. I have heard conflicting opinions as to this fashion of placing trees in the middle of the crops, but it seems disadvantageous. Some have thought the shade beneficial, as saving the crops from being prematurely parched by the burning Italian sun, but experience refutes this doctrine, if, as I have been assured by several agriculturists, the corn round the trees grows less than half as thickly as in other parts of the field.

The Garden.

CONSTRUCTION OF FOUNTAINS.

IN a previous number of the MAGAZINE, we had something to say on the construction of fountains, and we advocated their being placed in all gardens which possessed suitable surroundings. In the neighbourhood of London and other large cities, many are the attempts to produce something ornamental in

basin sunk in the ground, from the centre of which starts the jet, the splashing of which, as it falls into the basin, sounds so pleasantly in the ears of the passer-by. We shall endeavour to instruct our readers how such an unpretending fountain can be made.

Fig. 1 represents a section through the

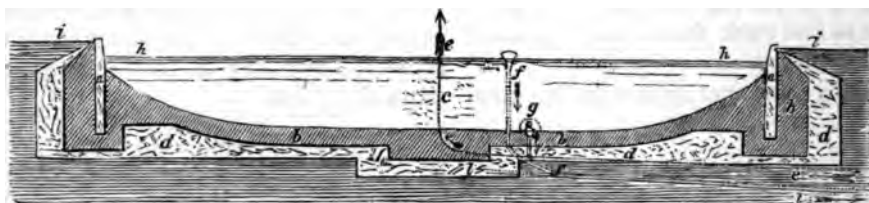
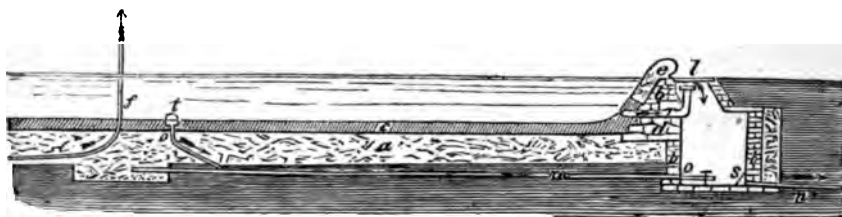


Fig. 1.—Section of Fountain Basin.

the outward form of the basin. This we conceive to be a mistake. If any of our readers would like to see our beau-ideal of an unpretending fountain, suitable for a suburban villa, let him pay a visit to Fountain Court in the Middle Temple, within 100 yards of Temple Bar, and in the very heart of London, and

centre of the fountain basin of, say 15 feet diameter. *a a*, at the sides, are the "rim-stones;" *b b b*, concrete-lining of the bottom, carried up around and enclosing the rim-stones; *c*, the pipe for jet; *d d d*, gravel or rubble-stone under the concrete-lining; *e e*, supply pipe; *f f*, waste-pipe; *g*, plug in bottom



Fountain Basin.

the outward form of the basin. This we conceive to be a mistake. If any of our readers would like to see our beau-ideal of an unpretending fountain, suitable for a suburban villa, let him pay a visit to Fountain Court in the Middle Temple, within 100 yards of Temple Bar, and in the very heart of London, and

basin; *h h*, surface of water inside basin and *i i*, surface of ground outside basin.

The method of construction is:—First, to dig a pit of the diameter and depth indicated by the cut, allowing room in the bottom, if the material is clay or other heavy soil, sufficient for 18 inches to 2 feet of

rubble-stone, or coarse gravel, below the concrete lining. If the soil is gravelly or sandy, and not very retentive of moisture, a depth of 6 to 9 inches of gravel will suffice. Second, lay down the supply and waste pipes, together with a tile-drain, *ll*, extending outward from the centre of basin-pit, to carry off the under or land drainage (this latter precaution being necessary to prevent the heaving of the foundation by frost in winter, when the basin will be empty, and the frost liable to penetrate the ground below the concrete). Deposit the rubble-stone or gravel, and back it well; then, third, follow with the concrete. This to be made of small broken stones or gravel, with hydraulic cement and sand, in the usual manner. The depth of the concrete to be not less than 6 inches, and to be well settled and compacted by a rammer as soon as deposited. The surface to be basin-shaped, as represented, and smoothly plastered over with cement. The rim-stones are set vertically on a bed of 6 inches of concrete, the concrete extending continuously under and around the stones as represented. The stones to be from 4 to 6 feet long each, the top part exposed to view to be 4 inches thick when dressed, and the end joints to be made sufficient even to make snug work, the joints to be well filled with mortar.

Fig. 2, is a half-section of a basin, constructed differently. The plan is similar to fig. 1, with the omission of the vertical rim-stones, and the substitution of a rubble-stone wall, which is topped, and partly faced, by cut stone, to give a more appropriate finish to a basin of this character.

a, rubble-stone filling; *c*, concrete-lining;

bb, brick-work; *d*, rubble-wall, laid in mortar; *m*, 3 inch tile-drain to drain foundation; *n*, drain-pipe, connecting with sewer; *o*, 2-inch pipe for emptying basin; *l*, lid to well; *r*, overflow pipe; *s*, screen at mouth of drain-pipe *n*; *t*, screen over mouth of pipe *o*; *e*, cut-stone rim.

The water is $2\frac{1}{2}$ feet deep in the basin. The supply-pipe curves upward through the foundation and concrete, and communicates with the fountain.

A well, with manhole, similar to that shewn on the right of the cut, is constructed on the opposite side of the basin, and receives the main supply-pipe, with a regulating cock.

It will be noticed that in both of these designs no dependence for tightness is placed on the *joints of the rim-stones*. The concrete surrounding the stones in the one case, and the rear wall in the other, are the main reliance for security against the leakage of this part of the work. It is impossible in this climate to construct a facing of stone, under such circumstances, in a way to prevent the constant expansion and contraction from affecting the joints. Leaks may be slight at first, but the movement is constantly going on, and they will keep on the increase until they will demand, sooner or later, a radical cure. With concrete, or a rear wall, in connexion with the rim-stones, so situated and protected as not to be influenced by changes of temperature and the disturbing action of frost, there is safety.

About the cost of these fountains it is not easy to form an estimate, as the principal expense being for labour, so much must depend on the locality.

average 14 inches in length by 10 inches in width, and that when young they possess a most agreeable perfume. As we saw it, it appeared to us to have greater texture or substance about it than most other Maiden-hairs. It will be a very choice companion for the *A. Farleyense*, which has had such a run in public estimation.

is larger growing than *C. Veitchii*, takes, indeed, more of the style of *Croton maximum*, but has not the Laurel-like leaf of that strong, growing sort. The colouring of *Croton lacteum* (fig. 3) is superb. It is not a bit too strikingly brought out in the engraving, and even grows more decided, as we saw it, as it gets older. No collection of Crotons

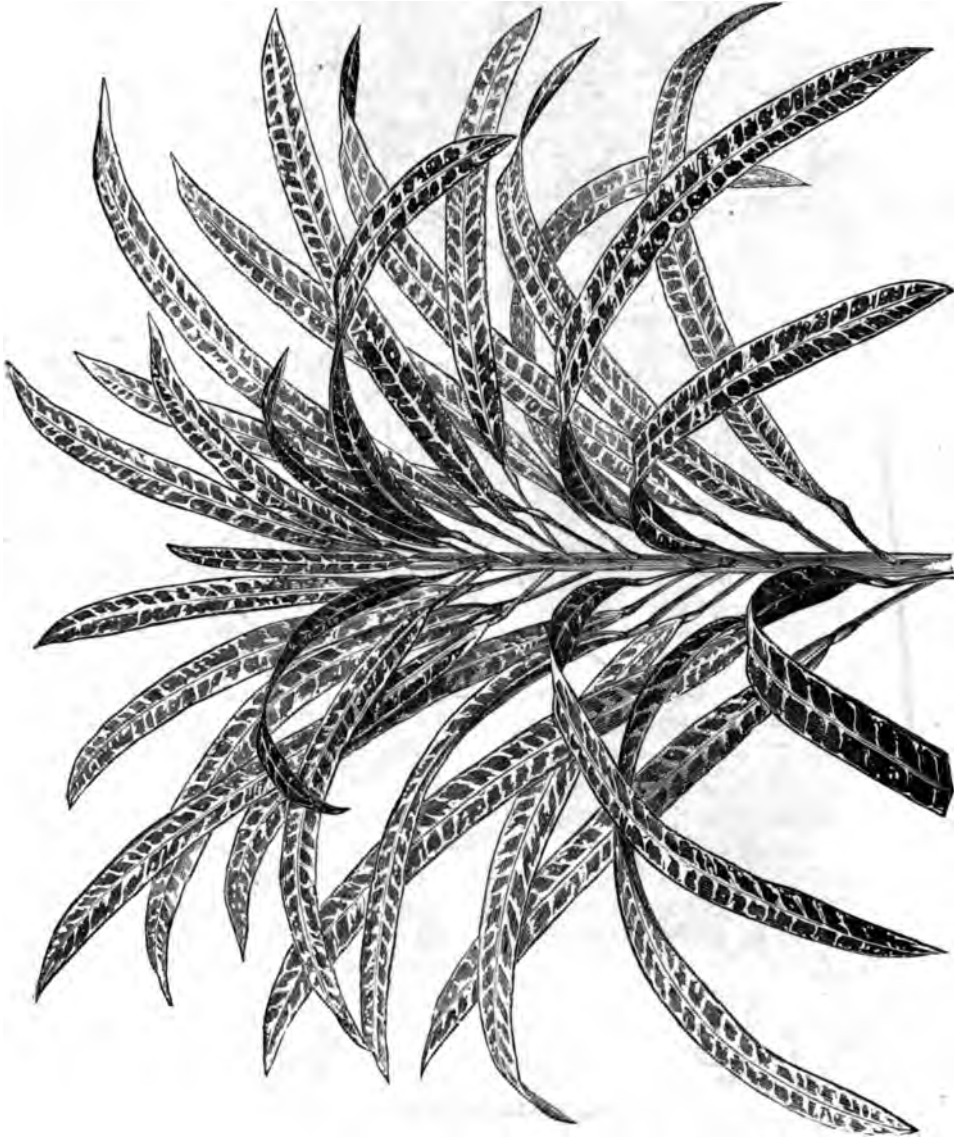


Fig. 1.—*Croton (Codiaeum) Weismanni*.

CROTON LACTEUM.

This assumes more of the shrubby race than the one which we have described. It

will be complete without the one in question. As a companion plant for many, indeed most of the *Dracænas*, we know no better. W

with these subjects and with Palms, no house purpose. It is thus described in the *Messrs* need be without effect either in summer or Veitch's Catalogue :
 winter. Many of these have yet to be tried "A distinct and very free-growing variety,



Adiantum amabile.

On the 30th of August, 1854, they look quite with bluntly acuminate leaves, which measure the sort of thing, and will in time, in our from 6 to 8 inches in length, by 2 to 3 inches in width. The upper surface of the leaf is a junior be largely drawn upon for that

dark shining green colour, the mid-rib and veins being very broadly marked with milky or yellowish white colour, rendering it most distinct from any other known variety. It colours very freely, and will be most useful for decoration on account of its distinct character."

the great trouble and expense incurred by them in the introduction of new plants may be looked upon in one sense as a trade speculation, the failures which so often occur, entailing heavy loss upon them, would certainly deter them from further speculation, did they not possess that dogged determina-



Fig. 3.—*Croton lacteum*.

LISIANTHUS PRINCEPS.

The enterprise of our leading nurserymen cannot be too highly praised, and although

tion to succeed in anything they undertake, which may be summed up in the few, but expressive words of British pluck.

The subject of our illustration was described by the late Dr Lindley, "the noblest plant in existence," and such an expression from him, with his knowledge of the Flora of the world, must at once stamp it as a gem indeed.

This plant belongs to the order Gentiana-ceæ, the members of which, as a rule, are gems of the vegetable kingdom, yet somewhat difficult withal to cultivate. "It is a compact branching shrub, growing about 2 feet in height, the leaves are opposite, oblong, lan-



Fig. 4. *Lisianthus princeps*.

... been
... again,
... rather
... were
... Upper
... to whose kindness we are indebted
... illustration of this beautiful plant.

ceolate, acuminate, and dark green on the upper side, paler below; the blooms are produced in graceful drooping racemes, of from three to five; the flowers are tubular, the calyx being about half an inch long, and emerald green, the corolla is tubular, some 5 inches in length, and upwards of an inch

wide, the colour of the tube is rich scarlet, melting into golden yellow at each end."

This has been called a greenhouse plant, but although it delights in a cool temperature, growing at elevations of from 10,000 to 11,000 feet, it will be found to succeed best in the temperature of an intermediate house. The soil should be a mixture of about one part light good loam, two parts fibrous peat, and one part good leaf-mould and thoroughly decomposed manure, to which sufficient sand should be added to make the whole gritty; the pots must be well drained, and care must be taken not to give the plants large shifts,

as they will be found to thrive much better with small and frequent re-pottings.

Lisianthus princeps is a native of Pampuna, in New Grenada, the home of *Ada aurantiaca*, some of our choicest *Odontoglossums*, and many gems of the Orchid world; and as the treatment of these plants is now pretty well understood, there is no reason why we should fail with this plant. Unlike the Orchidaceous plants this member of the Gentian family would appear to be somewhat rare, unless the eyes of collectors have been too often directed upwards to the epiphytes, and the more humble become overlooked.

The Veterinarian.

INCLINATION, OR OBLIQUITY OF THE HORSE'S FOOT.

THIS subject has been for long a bone of contention amongst fanciful theorists and superficial observers; and it is remarkable how many have been led to foster the errors originated and hand them down as truths.

The angle of inclination or obliquity of the horse's foot is a point which farriers should be practically acquainted with, but we find by experience that as a rule they are quite ignorant of its importance in the management of the foot, and therefore they diligently treat all "badly" alike. The position of the limb is mainly ordered by the obliquity of the hoof—it may be too upright or the reverse; and the action of the animal may be greatly improved or rendered wretchedly bad. His legs may be grossly deteriorated and he may be caused to fall, and these results will arise—indeed, they are too common now—from the system of cutting the foot in ignorance of the plan for preserving the proper angle. The common mistake into which falls the theorist, who has newly taken up the subject, is the conclusion that all feet have the same inclination. He may be seen standing a few paces away from the side of the animal, and, unaided by anything but his eyes, concludes all previous statements, and determines the inclination to be 45 degrees, and therefore to produce such an angle, he cuts the foot considerably more than is necessary. The "theorist" has not observed that the horse's leg is not straight, but is bent at the knee, and the foot is not perpendicular to the ground, but is inclined most awkwardly. The heels being cut off, the foot is materially weakened, and the horse is certainly occasioned, by the loss of the heel, to cause the horse to

stumble; while the two states—low heels and a long toe—strain or lacerate the back tendons, as a result of unnatural leverage induced.

If the horse stands upon a stall floor too much on the incline, and works in a hilly country, he needs no other treatment to render him almost useless before half his natural life is expired. In the stable he will be found standing as far back as possible, and if he can reach the cross gutter behind, the observer may be certain to find him with the toes placed in the centre, or lowest portion, while the heels derive the support of the sides, which are higher. This the dumb sufferer practises to lessen the tension upon the back sinews. If he cannot obtain this assistance by reason of a short chain or halter, he will stand across the stall, and as his bed will doubtless be somewhat disarranged, according to the groom's notion of propriety, he receives a chastisement when that worthy enters the stable, and probably an injury as well, such as a prick from a fork, contusion of the shoulder from running in fear against the manger, and now and then a broken rib or limb, by the blow from a fork-shaft or other convenient bludgeon.

The consequences of lowering the heels so as to obtain an angle of 45 degrees, in some cases may be very serious, and we have known horses rendered absolute cripples for weeks, because the horn was removed so far as to expose the sensitive parts, and deprive them of support and protection, when by common observation it might have been ascertained that such a degree of inclination is not at all natural to the foot under treatment. Strong, and straight or upright feet with short pasterns may be damaged, and

animals caused to be excessively awkward, if feet, already low at the heels, having thin, and weak soles, long toes and iced walls, are subjected to the process have named, the consequences are very serious.

The angle of inclination varies in different cases, and the fore feet have always a lower angle than the hind. This may be ascertained for by observing that the former are actively used for suddenly arresting the horse in rapid flight, the hind feet being used for propulsion, for each of which they are admirably formed. Nevertheless, we do not admit that it is correct to say, as many authorities do, that the angle of the

horse's foot may be taken as being 45 deg. After repeated trials, we can state with confidence that there are more healthy feet having an angle of about 55 deg. than of any other kind. In other words, that is the average of numbers, being 10 degrees above what is often said to be the case.

As the angle of obliquity in the horse's foot is of so much importance in maintaining a proper position under all circumstances, it is useful to endeavour to preserve that degree which is necessary for the particular form of limb. In the preparation of the foot for the shoe this is seldom taken into account; we shall, therefore, endeavour to take up the details in our next.

HORSES' SHOES.

AMONG the many evils which tend to the destruction of horses' feet, shoes may be included. They rank next to the excessive use of knife, rasp, and other mutilating

probably the most common error into which ignorant farrier plunges, is the practice of fitting strong heavy shoes when the feet are weakened from undue reduction. The horse now needs protection, he argues, but to understand that an extra weight of shoe has to be carried, and at a time when the hoof is too little means for its proper attachment. Heavy shoes require more nails, and already reduced are not able to accommodate them; thus it happens the sensitive parts are either compressed by the bulging of the shoe at the place where the nail or nails are driven in, or they are punctured—and in the language of the groom and farrier "pricked;" which lameness of more or less duration results.

Other evils are engendered by the application of this clumsy remedy. It is impossible to drive sufficiently the clenches of the nails into weak feet. The animal winces under the application of each stroke, and the brutal farrier

not unfrequently loses his temper, when the suffering animal is severely chastised, almost invariably by the tools that happen to be in use, marks of which may sometimes be seen on the surface of the body hours afterwards. The feet swell under effects of moisture which they now absorb rapidly, and the position of shoe and nails is altered; and when the foot contracts again the clenches appear like huge hooks starting from the surface of the hoof, and not unfrequently cause injury to the opposite leg.

Again, the action of nails on such feet being like that of a wedge, parts are separated, and thus the weight of the armature, as well as effects of heat and moisture combined, do not fail in loosening the shoe, and finally losing it, as well as splitting piece after piece, until it is a difficult matter to put on a shoe at all. Heavy shoes impede action and cause it to be slovenly, clumsy, and unsafe, and as we have proved do not wear so long as their weight and strength suggest. The foot is not raised so freely from the ground, and is put down with a sliding action, and altogether the animal assumes a gait altogether unnatural. We have found

that large horses shod in the manner we now condemn, the iron upon each foot being $3\frac{1}{2}$ or 4 pounds, do not wear the shoes longer, and in many cases not so long, as when the shoes were one pound or more lighter; and to those who have the supervision of horses doing heavy as well as rapid work, this fact must recommend itself as well as to those who take the shoeing by contract.

There are other defects which are connected with shoes; these arise from the method in which the holes are made, which call for a special mode of pointing and driving the nails. Holes are either made in a seam or groove, known as the "crease," or "fullering," or "stamped," *i.e.*—they are punched without any such groove, and some men make what they term *coarse* holes, while others adhere to the *fine* system.

Now when coarse holes are made, we understand them to be farthest from the outer edge of the shoe, but each keeping an uniform distance; the fine seam consists of holes placed very near to the outside. The direction of the holes is sometimes the opposite of what it should be. One or all may be pointed outwards, others are the reverse, and therefore the smith who has to put on the shoe, probably discovers such a hole, which is the last, and to save trouble in alteration, as well as taking off the shoe, foolishly drives the nail, which being curved by the direction of the hole, important parts are damaged and lameness follows. Holes at the toe and heel often prove inconvenient from this cause; especially in all mutilated feet. When holes are directed inwards from a fine seam, the nails are caused to approach, wound or press upon the sensitive parts, while the hold upon the hoof is but slight, and pieces are

more readily split off. In the coarse style, equal care is required, as parts are still likely to be wounded, particularly when nails are driven very high.

When shoes are too light, they are equally prejudicial. They either are subject to fracture, too rapid wear, or opening at the heels, and thus prove destructive to the hoof or opposite leg during action.

Shoes should be of moderate weight, in order to provide for the wearer requisite protection and durability, so that too frequent removals may be avoided, which are detrimental to the hoof. They should likewise be so constructed that their weight may not cause too great waste of muscular power. If a horse can travel for a whole month in a shoe 5 or 6 ounces in weight, it will surely cause a great and unnecessary expenditure of muscular energy if he is compelled to raise from the ground 3 or 4 ounces more; such waste must be supplied, and that at the cost of the ability of the animal as well as extra food. Lastly, shoes often prove great evils because they provide no means of safe foothold. It is absurd to place flat shoes upon draught horses, when heavy loads are to be moved; and those up heavy gradients and over greasy stones. When winter covers the roads with ice and snow, man at once avails himself of the plan of providing heels and toes on the shoes of his horses for safety, but denies their utility at other seasons when from a coating of greasy mud the stones are equally as dangerous. We are at a loss to see the course of reasoning in the latter instance, but do not fail to see the end in weakened legs, sprained tendons, and adjuncts to destruction of a sound state of the horse's hoofs.

SULPHUR TREATMENT FOR THE LUNG DISEASE IN CATTLE.

NG the various remedies propounded a specific for the lung disease in ock, is the inhalation of the fumes from burning sulphur. It is, how-10 means a new discovery, as one led to suppose from the vague ac- which have recently appeared in ocal papers, and we are somewhat o answer for the fact that this once raunted, *thoroughly tried*, and now remedy, should crop up again.

eat sulphur cure gained a most un- notoriety during 1867, in the city of

The life of the remedy was ex- vigorous while it lasted, and the etween its enthusiastic advocates and onents, hot and high-spirited; but g carefully tested by men less san- ring cool heads and weighty judg- affair rapidly collapsed, and at the few months was only remembered ulous attempt to curry favour with ; and draw money from its pocket.

an Irish metaphor we, however, "there was more than nothing in "sulphur cure," hitherto heard

as by no means a stranger among lies of the medical man and veteri- Its properties, when composing acid converted into the form of watery were more or less known and aced from remote times, as being y dangerous when used indiscrimi- of little or no service in: chronic sive diseases. It was due to the ntlemen already named to say they sulphur cure "great," and in their became "a great mistake."

ime before, since 1858, the use of inhalations was attracting notice edical men, particularly as ad- l by instruments known as "ato- pulverizers," or "spray producers."

The most simple illustration of the instrument in question is that in use for the spreading of perfumes, which consists of two pointed glass tubes, placed at right angles to each other, one of which dips perpendicularly into the fluid to be dispersed, while the other serves as a means for blowing a current of air, and this, exhausting that from the upright tube, causes the fluid to rise, and eventually be distributed in a mist or vapour. In bronchial and pulmonary diseases, medicated fluids were found to be useful in allaying irritation or promoting secretion, and thus relieving the distended vessels gave rise to easy breathing. Amongst the many remedies, solutions of sulphurous acid, *i.e.*, the fumes of burning sulphur passed through water, ranked as ore, and was found useful in producing copious secretion from thickened membranes, with easy breathing, and almost painless expectoration. The more primitive method of inhaling the fumes direct from the burning sulphur, however, constituted "the perfect cure," and soon became established as such, for many diseases which had no existence whatever, except in the wreck of minds that belong only to hypochondriacs, were dissipated by it. Men who had slight affections of the tonsils and others of a chronic catarrhal nature, were said to be cured of asthma, and even consumption, and the remedy became at once undoubted. There were the men, alive and well, and their being in the flesh was due to the "sulphur cure." However, shortly some really asthmatic took the cure and rarely escaped dying, others with acute cases aggravated them still more, and the men of Glasgow exposed the whole r.

More than four years have e l the above events took place, yet, in the phoenix, the "great cure" rises : its ashes, and people are quite as r

rush and write their testimony of inaccurate observation, and ignorance of things in medical science as before. Banished from Scotland by human beings, it now has seized upon animals, and for pleuro-pneumonia, or the lung disease of cattle, it is said to be "the perfect cure." At a harvest home, held at Hitchin some time ago by some good men with large hearts, but, unfortunately for science, possessing an imperfect acquaintance with the morbid anatomy and pathology of contagious pleuro-pneumonia, the welcome tidings was announced that a cure is now found for the disease, which proves to be a fungus on the lungs. Would that we could hail this as authentic intelligence, but, alas! sulphur in all its forms has been tried for animals, and in every case of contagious pleuro-pneumonia has failed; therefore if the authors of the second genesis of sulphur-curing have witnessed any good effects, we can only come to one conclusion, which is, the affected animals were not affected by the lung disease now stalking through the land.

As we have pointed out on various occasions in our columns, there are two kinds of pleuro-pneumonia:—one the common native or indigenous, simple and curable form, which frequently runs its course mildly, and disappears altogether without treatment; and the other, the epizootic or contagious form, of foreign origin, which is usually fatal to the extent of 50 per cent., and for which no cure has yet been found. In both cases there are

similar *post mortem* appearances, and the false membranes found adherent to the surface of the lungs, which have been pronounced as "fungous" is mostly present as an evidence of the amount and character of the inflammatory action that has been going on. How the fumes of burning sulphur are to reach this mass of morbid production, we are not informed, as anatomy proves that in health and disease there is no direct passage to them. When we hear statements indicating a positive ignorance of one of the simplest truths in anatomy, we may be always certain that the collateral affirmations of a physiological or pathological nature are similarly constituted, and have to regret that such should go abroad as truths, which are not disproved until much patience, time, and money are lost.

We should be sorry to frustrate the progress of truth in the work of eradicating such a fearful disease from the stock of our kingdom, but after many years' experience with every available means—sulphur included—nothing, we are compelled to admit, has yet cured contagious pleuro - pneumonia. The indigenous form, or some bronchial attack, we believe, was mistaken at Hitchin for the contagious variety, and so errors are propagated daily, but if our readers are hard of belief, they may test the remedy and judge for themselves. Practical proof is worth a bushel of theory, but, we must also add, practice without theory is a blind guide.

The Dairy and Poultry-Yard.

BUTTER FACTORIES.

THOUGH the Americans have succeeded in establishing, and successfully carrying out, the factory system, as is especially the manufacture of butter, that principle, as regards the production of butter, does not seem to meet with general approval. We believe that it can be manufactured in as good condition in the factory as in the private dairy; and from those that have been established in America, the best results, both as regards production and profits, are reported. A correspondent of the *Country Gentleman*, in regard of butter-making in Franklin County, New York, says:—

Factory buildings are all of a better class than range cheese factories, and do not cost over half as much for the same number of cows, and even more difference in cost of fixtures and for labour.

Union Factory in Bangor was the first visited. This was not fully supplied with water the season, and reports, as the average amount of required to make 1 lb. of butter, 24.48 lb., they made during a portion of the season 1 lb. $\frac{1}{2}$ lb. of milk, which, as the product of ordinary in ordinary poor pastures, may be set as a very fair shewing. The aggregate of butter from this factory was 9522 lb., which was sold at 30 cents a pound.

Old Spring Factory of Malone made a pound of butter from 23.31 pounds of milk. Amount made, 10,000 pounds; sales to August 1st at an average of 30 cents a pound—for the remainder of the season 31 cents per pound at the factory.

Keeler Factory, Malone, made a pound of butter from 20.57 pounds of milk. Amount made, 10,000 pounds, which was sold at the factory at 31 cents a pound.

Berry Factory, Malone, made a pound of

butter from 25.1 pounds of milk, which they sold at 31 $\frac{1}{4}$ cents a pound at the factory. Like the Union Factory, they had not sufficient water to cool their milk, which defect they will remedy for the coming season.

Horace Dickinson's factory in Moira, made a pound of butter from 23 $\frac{1}{4}$ pounds of milk, and sold the butter at 30 cents a pound at the factory.

The Bailey Spring Factory, Chateaugay, made a pound of butter from 22.55 pounds of milk and sold it at 29 $\frac{1}{2}$ cents a pound at the factory.

The private dairymen have none of them kept their accounts so as to furnish information of value. One gentleman, a merchant, said his dairy of twelve cows paid him more money last season than nineteen did the year before, though the price per pound was one-fourth less. He attributed it to the factory system, and will keep twenty cows the coming season instead of carrying out his intention of reducing the number merely to supply the actual necessities of his farm hands. How far the improvements they have made are peculiarly due to the system of setting the milk in vogue there, is only to be determined by experiment; that the Jewett pan is a very great improvement upon the old system, there cannot be the slightest doubt. All who use it assure us that there is not the least difficulty in keeping the milk sweet till all the cream has risen, and that the cream does not acquire the filmy condition (which is now admitted to be a condition precedent to the production of strictly prime butter), and as a natural result, that there are no "white caps" or "fleckings" produced. That the co-operative or factory system, as practised there, is (compared with the farm dairy system) a very great economy of labour, and profitable in securing a uniformly good article, cannot be doubted. It must, moreover, be conceded that, as compared with any other factory reports which have come under our observation, these are exceedingly favourable to the system. It is to be hoped that such experiments will be made the coming season, both here and elsewhere, as it will settle many of the controverted questions in relation to butter-making.

net paying result to the farmer of over 1d. for each 100 lb. of milk. In the other each 100 lb. of milk produced 8.725 cheese, worth, after deducting cost of manufacture, 3s. 5d. and .809 of a pound of curd, worth, after deducting 2d., the price paid for manufacturing it, 9½d., making total result to the farmer of about 4s. 4d. each 100 lb. of milk. It must be borne in mind, moreover, that in this comparison I figured the prices at the very greatest possible disadvantage for the skimming man, the price, 6¼d. for cheese, being the best of the season, and 1s. 2d. for butter, very lowest for this peculiar product.

Year's prices would have shewn far fewer discrepancies.

The idea of the advocates of the partial method is that it is practically impossible to incorporate all the butyraceous properties of milk into the cheese, and, that by the loss of skimming the evening's milk, little more is taken out than ordinarily escapes with the whey. It is a somewhat suggestive fact, however, that if we take the foregoing figures as they came to me, making allowances or deductions for imperfect

manipulation, the aggregate product of butter and cheese from 100 lb. of milk is only 19.100 of a pound greater than where cheese alone is made upon the other days of the experiment, while upon the data which I have assumed to be more nearly correct, the product is .466 of a pound greater where cheese alone is made.

We must look elsewhere, then, for the advantage gained, since we can no longer deny that the skimmers do derive a very decided advantage, and since their own figures disprove their claim that it is only by saving an otherwise waste product.

Just here it may be pertinent to ask if it is established past a doubt that the value of the cheese depends, as many persons seem to assume, on the amount of the butyraceous matter which it contains? Is it not possible that a cheese may contain an excess of butter, and that the incorporating of it into the cheese is little less a waste than permitting it to run off into the whey?

But I do not care to pursue the subject, and only offer the suggestions for the purpose of inducing experiments and eliciting information from others.

FEEDING FOR EGGS, &c.

THE WRITER in the *Working Farmer* gives the following advice with reference to the feeding of fowls for producing eggs, or for other purposes:—

Fowls cannot produce eggs unless their food contains the elements of which the egg is composed. The kind of feed that is offered must be determined by the object to be attained in feeding them. Hens intended for the market should be fed on that kind of feed which is known to contain a large percentage of the fatty or oily substances. But hens kept as layers should be fed on that kind of grain which contains a larger share of albumoids or egg-producing elements. In addition to the essential quality of album-

en required in the organism of the fowls, the laying hen requires an extra amount for ovulation—the white of the hen's eggs being about 12 per cent. of albumen—and this must be furnished in her feed. By referring to a chemical analysis of the different cereals, it will be seen that corn contains the greatest amount of fatty substances, while wheat contains a larger amount of albumen than any other cereal. To fatten hens, therefore, feed corn. To procure eggs, feed wheat. Meat once a-day, in winter, will prove beneficial to laying hens.

I allow my hens free access to troughs always kept well filled with wheat screenings from the mill. If allowed to choose their own time

for eating, hens will eat often and but little at a time—never too much. Chickens should be furnished with plenty of limestone gravel. Some say pure water is essential to laying hens; I prefer to give them milk, as that fluid not only serves to moisten their food, but also contributes albumen, which goes far to the formation of the egg.

Of course the kind of food, when there is not much variety, will have a special effect on fowls, animals or men; but we doubt whether this rule of selecting fatty or oily grains to produce fat, and other grains containing "albumoids" in abundance to obtain eggs in preference to fat, is a rule which sagacious poultry breeders will generally heed. A far better rule, in our judgment, is to let the flock select their own food as much as possible—that is, let them have access to such food as is known to suit them; let them have all they want of it, and the "albumoids" and the "fatty and oily substances" which it is deemed they should possess, will not be slow in forming part of the chicken economy. The idea of feeding wheat as a speciality for eggs, is probably about as correct as feeding egg-shells to produce other egg-shells. Some think it extremely important that lime, in the form of oyster or clam shells, or of pounded bones, should be given to fowls, or they will lay soft-shelled eggs. These substances make good grinding materials in the operations of the gizzard, but whether if digested, they take on form of egg-shells more readily than they assimilate to flesh and feathers, and bone, is not yet demonstrated in our judgment. But if one article of food is a speciality for a certain part of the fowl—the egg-shells or the albumen for instance, then we should know

what to feed to produce feathers, or the horny material which enters into the beak and claws, or the skin, or the eyes, or the intestines. Some Brahma chickens have a ridiculous habit, after parting with their down, of running about several weeks stark naked or nearly so; cannot something be fed them to produce feathers at the right time, or something else to protect them against the heat or the cold? The answer of course is in the negative, and we strongly believe that the same is true as to what food will operate as a speciality for eggs or fat. A fowl's gizzard is a chemical laboratory in which the nature of things is very materially and rapidly changed, and appropriated for purposes which we cannot know very definitely. Fowls eat some things, which if they consulted our tastes, they would be sure to discard—things which cannot be mentioned always to ears polite, but it will embarrass chemistry to discover any trace of them in the eggs or the flesh. The best rule is to feed them with what they like and plenty of it, and that of course includes a large variety. Let *them* choose their food where it is possible. They certainly tire of special articles when confined to them week after week, just as human beings do, and it is then that they go to eating eggs, or feathers, or even each other's flesh, and disgust their owners by refusing to lay eggs, or to grow large and fat. It is more science than they can stand; but give them a variety to choose from, and consult their own tastes to an intelligent extent, and that wondrous internal manufactory to which their food is consigned will, as a rule, not fail to build up the hen in all her departments to the full gratification of her owner.

The Naturalist.

THE PARASITICAL FOES OF THE FARMER.

IN a previous number we quoted an extract from a paper read by the Rev. E. A. Bloomfield, of Guestling, before the Framlington Farmers' Club, treating of the animal friends and foes of the farmer. The following extract from the same lecture refers to the vegetable and parasitical enemies which farmers have to guard against:—

Our vegetable foes not only include the weeds which cumber the ground and take the place of better plants, but also many ills which unusually go by the name of blights, such as mildew, smut, bunt, &c. With respect to weeds, I will only mention two weeds by name, the dodder and clover rape, both of which are very destructive to clover. They are both parasites, and live by sucking the juices of the clover plant. I cannot but think that the ravages of the dodder might be almost entirely stopped by sending in a man to mow out the infected piece as soon as it begins to show itself; or, still better, if he dug it out. The mowed pieces must be carried away. I know no method of preventing the ravages of the clover rape, that great brown succulent plant that appears so plentifully in clover fields after the first crop has been taken. It has been growing underneath the surface and sucking the clover long before it shows itself. The most probable means of diminishing its quantity is to be very particular to see to the cleanness of the clover seed. I think it is very probable, however, that the seed may be some years dormant in the ground, and in that case I do not know how we can guard against it.

Let us now go on to those special diseases of the corn which are often called blights. The mildew, with many other blights, as smut, and rust, and bunt, are caused by fungi;

in fact, are due to parasitic growths, which destroy or injure the corn. You all know what mildew looks like. The stem and leaves become discoloured, and at length the outer skin splits, and the parasite is disclosed. If you look at the infected plant with a glass which magnifies slightly, you will observe that the spots are dark and rough. Put a small piece under a powerful microscope, and you will see that the threads and spawn, or mycelium, is hidden in the straw, but what we see is the fruit or seed vessels. Each spore consists of two compartments, which are filled with sporules. But how did the seed enter the plant? Perhaps through the stomata or little openings which abound on leaves. At any rate, the mildew shews itself generally at these apertures. How, then, does the mildew injure the corn? It absorbs the sap which should go to nourish the grain, and is as true a parasite as the dodder. Moist seasons, damp situations, over-manured land, and lateness of crop all favour mildew; a plant on a manure heap is, in fact, almost always mildewed. And so, again, over-luxuriance will favour mildew. Well draining the land, and keeping the crops free from weeds, will generally prevent the mildew from doing much mischief.

Again, you all know the rust, or red robin. Different as it looks, there is good reason to believe that it is the same plant as that which causes the mildew, taking one form or the other, according to the circumstances—the state of the weather or plant. Here it does little harm, but on the Continent it is more dreaded than the mildew.

The next parasite I would mention is the smut. Some farmers, I have heard, like to see it in the crops, because it is

accompanied by a good crop. If so, I suppose the explanation is this, that a season which is favourable to the production of smut is also favourable to the corn. As to bunt or bladder brand, or stinking rust, this parasite completely fills the seeds and replaces the flower with a black disgusting powder, smelling almost like putrid fish. The infected grains are of a dark green colour, and at length become brown. If a grain is opened it is found filled with a black greasy powder. When the wheat is thrashed, the infected grains are broken, and the sporules stick to the sound grains and ultimately inoculate them. The object of dressing the wheat, therefore, is to wash off the spores, and if possible destroy their vitality. Some farmers dress their corn with arsenic, but I cannot think it is likely to do much good, while there are great objections to it.

All farmers, or nearly all, know something of the parasites which I have mentioned, but perhaps there may be many who have never seen the next—I mean ergot. The grain is completely changed, both in form and properties. It is black, and looks like the spur of a cock. It has long been known to be a powerful medicine. It has not so long been discovered that it causes most dreadful diseases when it has been eaten with corn. Rye is very subject to ergot, and it was suspected that certain dreadful diseases, formerly prevalent in some parts of France, were due to this cause. There seems little doubt that it was so, and it appeared probable that ergot has been the cause of dreadful disease even in Suffolk. It appears from the parish

register of Wattisham that in the year 1762 several persons suffered from an unusual kind of mortification of the limbs. In this case no doubt it was due to the ergot of wheat. Where lands are well drained, little or no ergot is to be found; but doubtless at that date there was plenty of wet, undrained land to favour its growth. But although ergot is now uncommon on wheat and rye in this country, it is often common on grasses. And it is not unlikely that it may be the cause of some of the mysterious diseases of cattle. Drainage is the great cure for it.

I now turn to the last disease of the grain which I purpose mentioning—the ear cockle or peppercorn, which is one of the most extraordinary diseases to which wheat is liable. The grains affected by it look just like black peppercorns, and the whole ear is altered in appearance. When the grain is cut in pieces, it is found full of a cottony substance packed close together. If the grain is fresh, and a little of this cottony substance be placed with a drop of water under the microscope, it is found to be a mass of eel-shaped creatures, which wriggle about with great vigour. If, however, the ear cockle has become dry, it must be steeped in water for a few hours before the ear is opened, or they will shew no life or motion. Sometimes 40,000 to 50,000 of these little creatures are packed together in one grain. Any one who has a moderately good microscope can verify this for themselves. It would be a good thing if more time were spent in searching into the wonders of creation which the microscope reveals.

POND FISH.

WE make the following extracts on "Pond Fish" from a communication of Mr Frank Buckland, Inspector of Salmon Fisheries, to the *Times* :—

A correspondent asks if I can recommend any new fish for our English ponds and lakes. I answer I will recommend—firstly, "great lake trout" (*Salmo ferox*). For several years past I have received, about Christmas day, large consignments of the ova of large lake trout—the young fish are just visible twisting about inside the egg—from the lake of Neuchatel in Switzerland. I have had the honour of being requested to undertake the stocking of the Obelisk Lake in Windsor Great Park with these fish. This lake formerly held nothing but coarse fish. The water, under the superintendence of Mr Menzies, was let off and the mud allowed to remain dry some weeks. A little house was built close to a spring of pure water in the park, and for the last five years we have hatched out in this house thousands of great lake trout. The result is that there is now a goodly number of these fish in the lake, and they have been found palatable and good for the table. We have already bred from fish now in the pond that came over as eggs packed in damp moss.

Secondly, I advise the trial of that beautiful fish the "*Salmo fontinalis*," or American brook trout. Four years ago I received from an eminent American fish-culturist a small tin box, packed in sawdust, containing ova of these fish. They thrived and prospered, and I have now some 15 or 20 specimens of "*Salmo fontinalis*" in the fish nursery—would it were twice as large!—in my museum. Some of these fish appear to be nearly three pounds in weight. They are too precious to handle. I hope, nevertheless, to breed from them this winter. In the tank with them are several great lake trout, handsome, fine fish, brothers and sisters to the Windsor

trout. The attendant has orders to feed the fish at the request of the visitors. Their food is pounded rump-steak and biscuit powder, and it is a glorious sight to see my scaly beauties jumping clean out of the water, and making the water boil again with the swirl and lash of their tails as they rise to the food. They feed best towards evening, and they tell me better than a barometer when the weather is about to change.

Thirdly, there is a fish common in Germany, and, I am told, frequently served at table in Berlin, the "Zandr," "*Perca Lucio Perca*," or pike perch. In appearance this fellow is half pike, half perch; he has teeth even more formidable than the pike. There is a stuffed specimen of this fish in my museum, lent me by Mr T. R. Sachs, Hon. Member of the Piscatorial Society, who caught it in Germany with rod and line. This "pike-perch" would thrive well in our ponds and lakes, and would be better eating than pike; but I should be very sorry if this ravenous rascal got into the rivers and injured my friends the salmon and trout.

Fourthly, the "Gold Schlei" or "Golden Tenel" has now been thoroughly acclimatized in this country, and the credit of this must be given to my friend Mr Higford Burr, of Aldermaston Park, Reading. A lady, fishing the other day in the squire's lake, hooked, but lost, a "gold schlei" that must have been over 2 pounds in weight. This is a most beautiful fish. There are several living specimens in my museum. They like stagnant, weedy ponds, where there are no jack or perch.

Fifthly, there is the "*Silurus glanis*," the "Sheat fish," or "Wels." This is common in Central Europe. They are an eel-like fish, much resembling the burbott of the Trent. Sir Stephen Lakeman brought over five or six of these fish from a tributary of the Danube near Bucharest, I took them down to

Mr Burr's, and they had a pond all to themselves. When the pond was let off the squire and myself waded about almost up to our necks in the mud for hours, but we could not find the *Silurus*. I expect the rascally herons have taken them, or, may be, they are in the mud still. These fish grow to a gigantic size. In the month of October I examined the skin and head of one of them, caught with a hook and line in the Upper Amazon, by Mr La Mert, who has just returned from that country. He has also given me an electrical eel—dead, unfortunately. This grand Amazon *Silurus* when caught was nearly 7 feet in length, and he has a mouth big enough to swallow a moderate-sized baby.

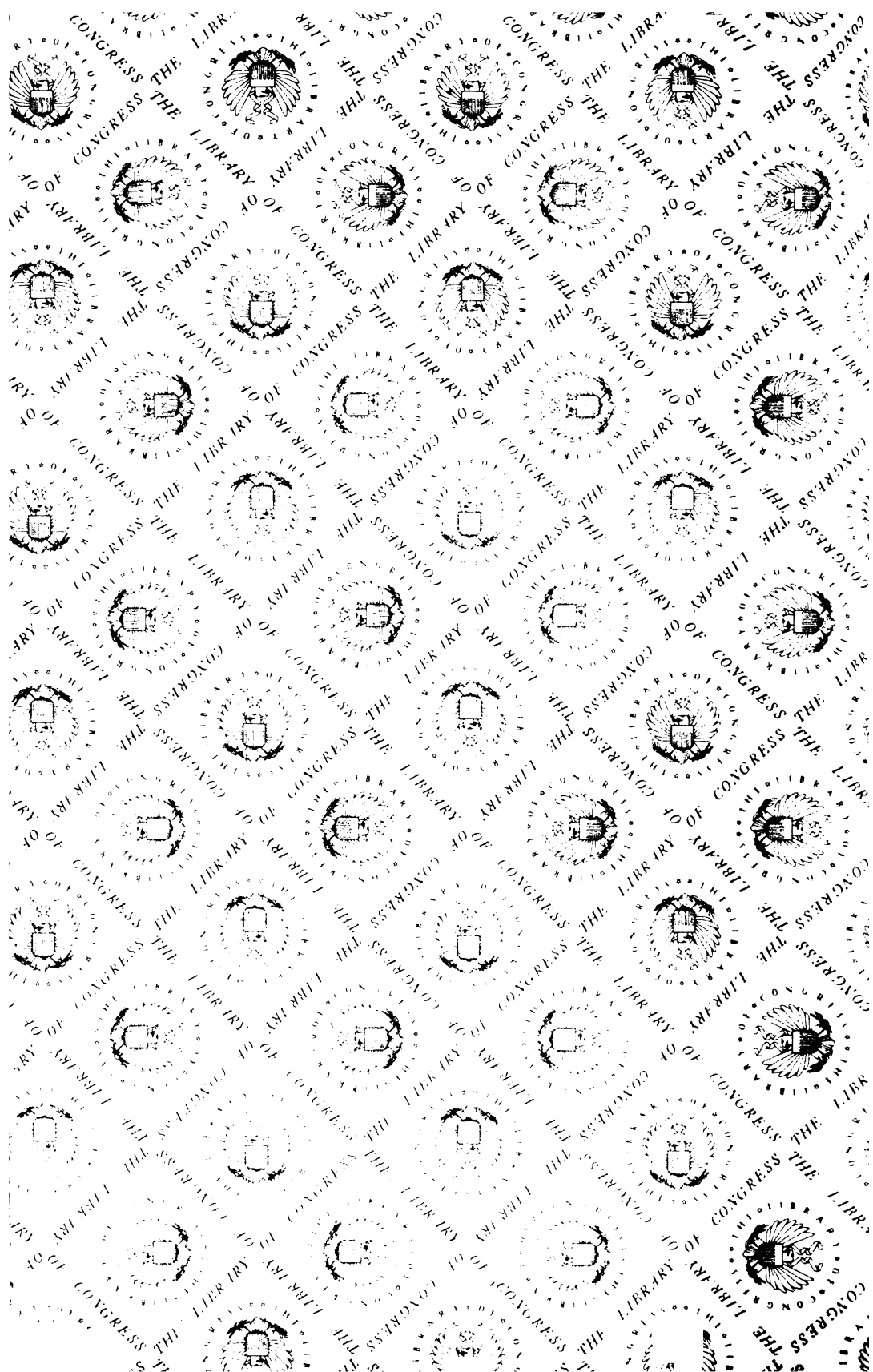
Sixthly, the "Peacock, or Paradise fish" from Ning Po, in China. I have two pairs alive in my museum. Mr Carbonnier, of Paris, first bred them in Europe; they made a nest, but the father fish ate all the eggs. I shall know how to manage him better next time. The Paradise fish are as yet much too dear to eat. There must be, I am sure, plenty of fish in the paddy fields of China that would live well in this country. I only wish I could go to the Celestial Empire in a Hansom cab.

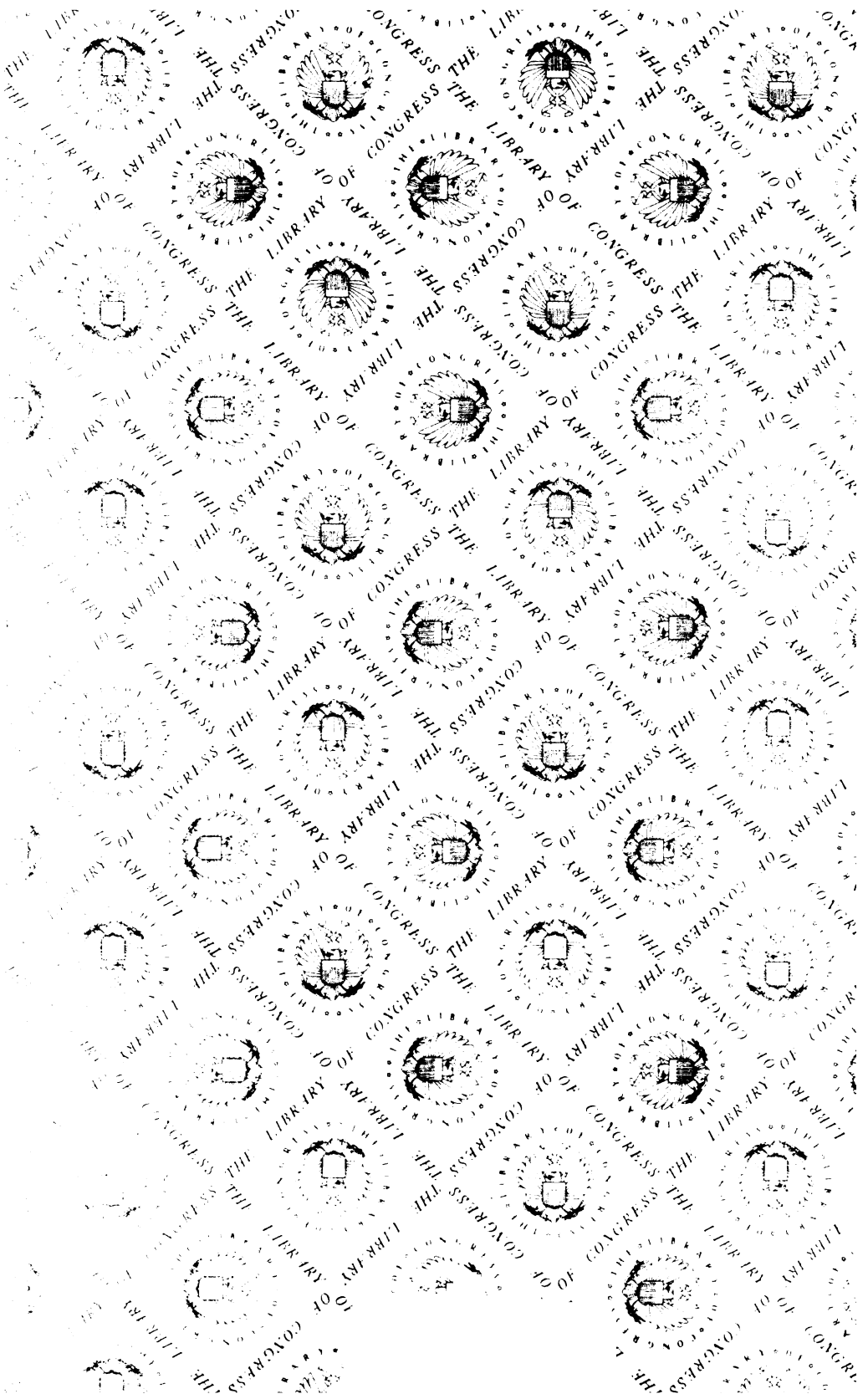
I am not at all sure but that the eggs of our indigenous "fresh water herrings," the

"Pollan" of Lough Neagh and other Irish lakes, the "Powan" of Loch Lomond, in Scotland, and the vendace of Loch Maben, near Locherbie, in Scotland, would not thrive in our lakes. The fish themselves are "bad to carry," but the ova might be taken artificially in thousands at the proper season.

They would do well, were it not for the pike, in such places as the lake at Blenheim Palace; and I am happy to say that his Grace the Duke of Marlborough takes the greatest interest in fish culture, and is making efforts to stock his beautiful lake with Neuchatel trout.

It is not impossible that the common smelt or sparling—the fish that smells like a cucumber—would live in clear and deep lakes. Mr Yarrell records that Colonel Meynell, of Yarm, Yorkshire, had great success with smelts in a freshwater pond that had no communication with the sea. I am often asked where yearling trout, salmon trout, &c., can be purchased to turn out. Mr Parnaby, of Troutdale Fishery, Keswick, hatches and sells many thousands every year. Mr Parnaby is now on his road home with living "black bass" and "white fish" from the American lakes. If these fish will breed in this country, they will be a great addition to our pond fish.





LIBRARY OF CONGRESS



000269047